WIRE AND WIRE PRODUCTS

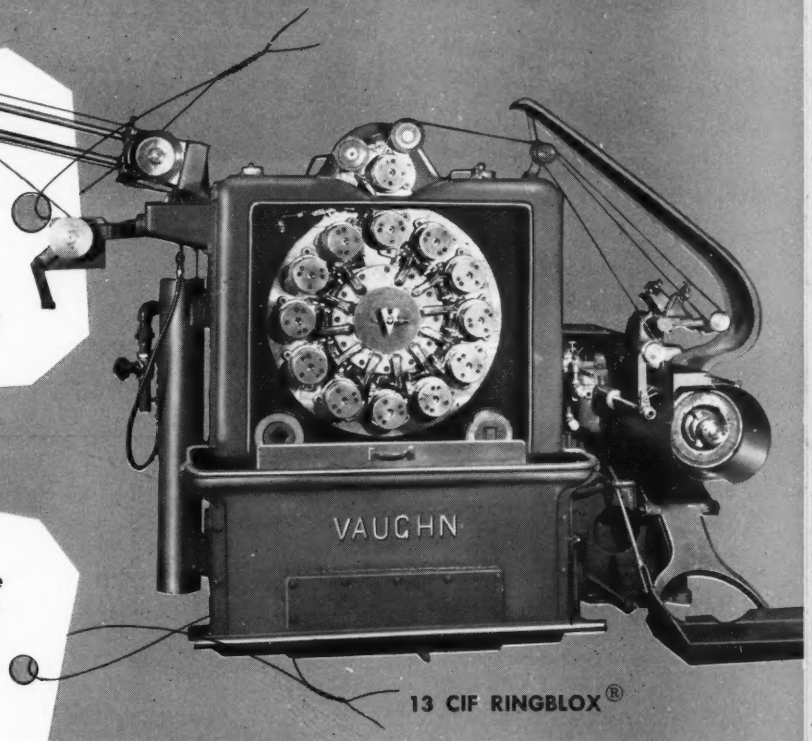
SEPTEMBER 1953

Non-ferrous WIRE

VAUGHN®

WIRE DRAWING MACHINERY

You get MORE WIRE in a given time with these modern Vaughn Tandem units—and at lower cost per ton. Choose RINGBLOX or Horizontal TANDEM depending on your wire requirements: we'll gladly consult with you. Write!



13 CIF RINGBLOX®

V®

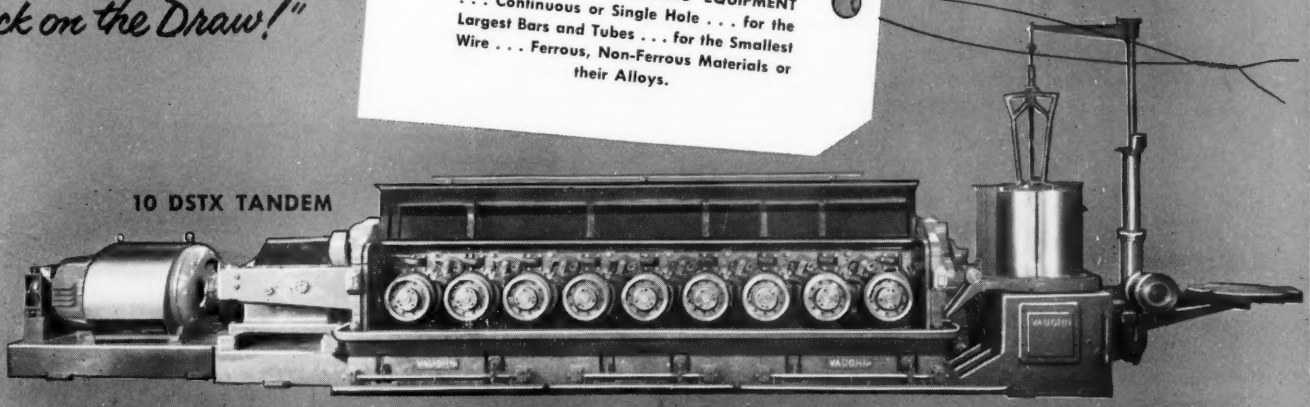
Quick on the Draw!"

THE VAUGHN MACHINERY CO.

CUYAHOGA FALLS, OHIO, U. S. A.

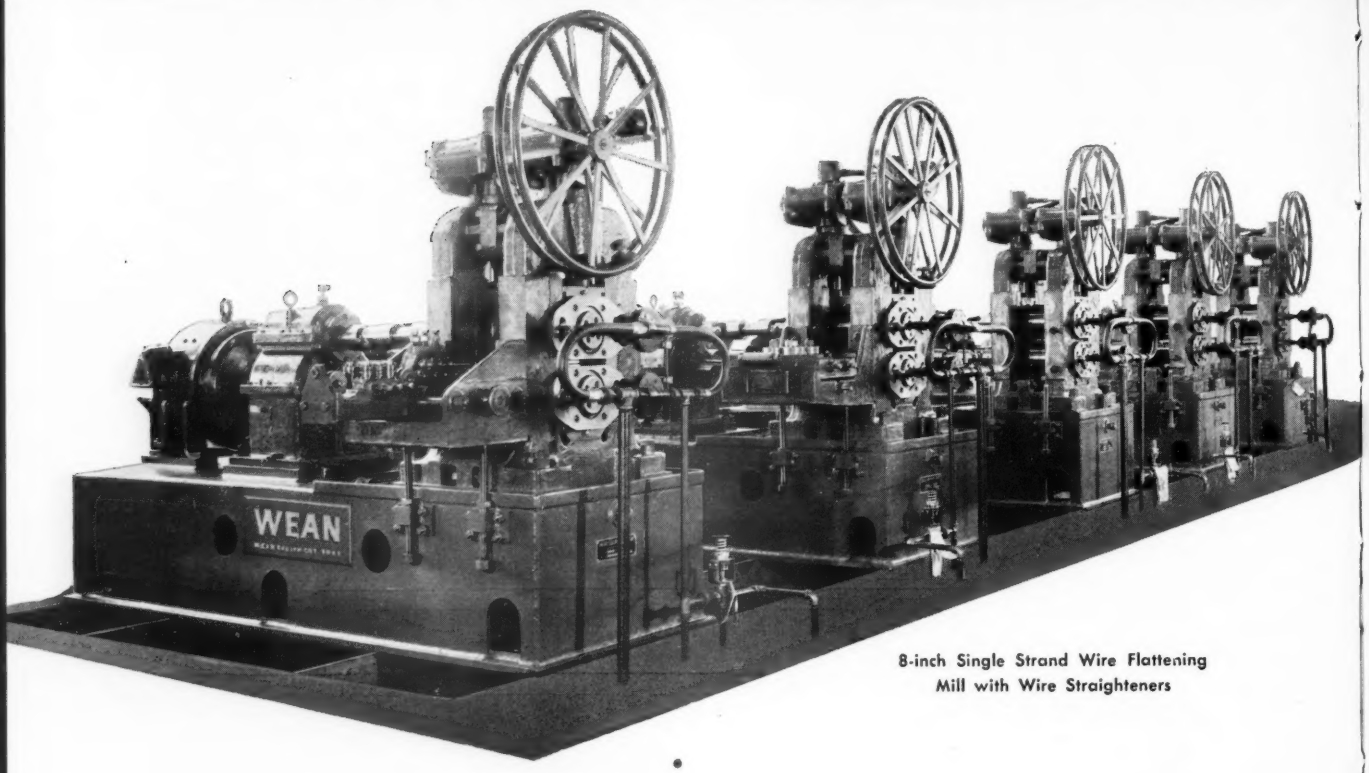
COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

10 DSTX TANDEM



OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

Wean



8-inch Single Strand Wire Flattening Mill with Wire Straighteners

A COMPLETE ENGINEERING SERVICE FOR WIRE MILL INSTALLATIONS

Complete Installations for Electro Galvanizing, Hot Dip Galvanizing, Patenting, Tinning, Wire Flattening, Nail Galvanizing and Blueing.

Complete Equipment for the Manufacture of Hexagon Netting, Hinge Joint Fence and Barbed Wire.

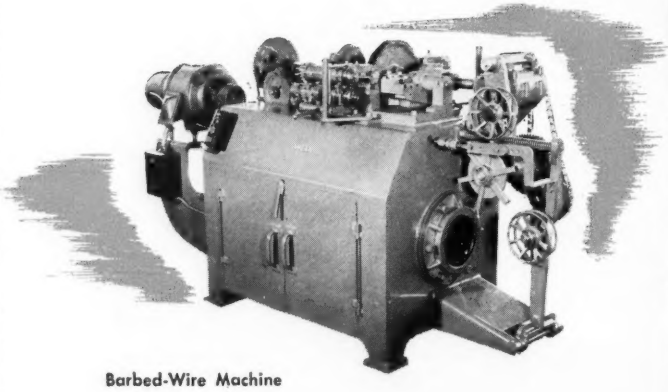
CHECK WEAN FIRST FOR WIRE MILL EQUIPMENT

STRIP MACHINERY

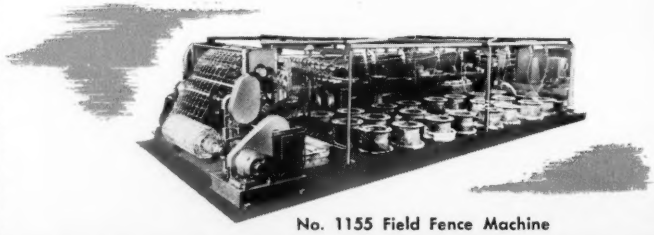
Slitting Installations. Cut to Length Installations. Bearing Metal Coating Installations. Two-Hi Rolling Mill Applications. Strip Grinding Installations. Levelers, Uncoilers, Pinch Rolls, Shears for Strip Processing lines.

WEAN EQUIPMENT CORPORATION

22800 LAKELAND BLVD. • CLEVELAND, OHIO



Barbed-Wire Machine



No. 1155 Field Fence Machine

Wean *Equipment Corporation*

WHAT DOES FIRTH STERLING OFFER YOU?

(ANSWER NUMBER 3)

UNBIASED RECOMMENDATIONS

Producing *tools* and *tool materials* for the cutting, shaping and forming of metals is *major* business at Firth Sterling. Hence, capacity to serve you best necessarily embraces "full line tooling" . . . high speed tool steels *and* tungsten carbides, or *both* as needed.

So, you can count on *unbiased* tooling recommendations when you make Firth Sterling your *one* source of supply for *complete* shop tooling needs. We have no axes to grind!

What are the advantages to you?

1. An integrated tooling program that saves you money by matching tools to applications, without temptation to apply more expensive tools than may be necessary.
2. Improved production from wider selections. A choice of 97 different grades of high speed steels and tool and die steels *and* a dozen grades of carbides in everything from die nibs to an almost unlimited selection of standard and special carbide tools and tips.
3. The purchasing economies inherent to buying from one source of supply instead of from several.
4. The finest "packaged" tool line today for easy handling, stocking, identification in the tool crib, and inventory control.
5. The consistently high quality assured by 64 years of leadership in development of special purpose steels and 21 years of pioneering in carbide and powder metallurgy applications.

Makes sense, doesn't it? Call a Firth Sterling representative, or phone the nearest one of our 87 distributors.

Firth Sterling Stands for Metallurgical Achievement—Past, Present, Future

I-3

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— INC. —

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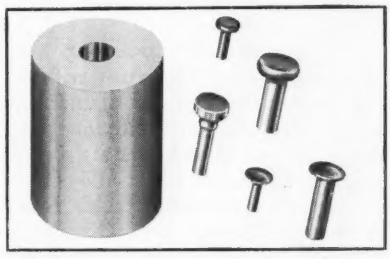
OFFICES* AND WAREHOUSES: BIRMINGHAM* CHICAGO CLEVELAND DAYTON* DETROIT HARTFORD HOUSTON* LOS ANGELES NEW YORK* PHILADELPHIA* PITTSBURGH* WASHINGTON*

DIE SPECIALISTS to the WIRE INDUSTRY

A COMPLETE LINE . . . CARBIDE AND STEEL

Firth Sterling offers wire manufacturers and fabricators the advantages of a *single* source of supply of materials for both tungsten carbide and tool steel drawing, shaping, forming and heading dies. This *complete* line, from famous Firthaloy, for maximum performance where carbide is a requirement, through almost one hundred grades of high speed and tool steels for cut-off knives, roll guides, die casings,

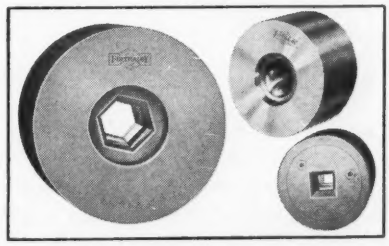


Carbide or steel heading dies—choose from the *complete* line which material best suits your needs.

forming rolls and similar applications, saves you time and money.

Standard items are available from warehouse stocks; others may be obtained from your local tool and diemaker.

Firth Sterling representatives are skilled in interpreting the needs of the wire industry and in suggesting the exactly right



Round, square, hex or specials—in carbide or steel as drawing requirements may indicate.

steel or carbide for specific applications. Because they know and sell both, you can depend on their unbiased recommendations to result in better, more economical tooling.

P-4

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets

Fastest Process Annealing FOR COILED STEEL WIRE

- ✓ Annealing cycles accomplished in minutes rather than in hours
- ✓ 50% lower equipment cost
- ✓ less floor space
- ✓ no scale, decarburization, or other atmosphere effects

On-the-job production figures prove that no other method compares with an Ajax Electric Salt Bath Furnace in speed, uniformity, cost saving, and general all-around efficiency in process annealing all types of steel wire as well as aluminum, copper alloys, and silver alloys.

Heating cycles are far faster. Absolute uniformity is assured. Thanks to the exclusive Ajax electrodynamic stirring action, the temperature does not vary more than ±5°F. *in any part of the bath.*

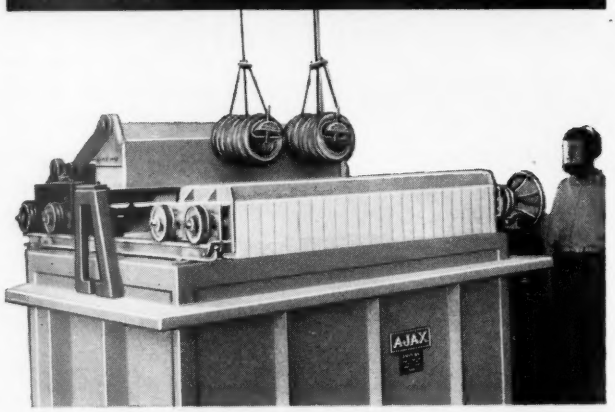
The Ajax Salt Bath eliminates all atmosphere with its accompanying problems of oxidation, pitting, and decarburization. Preservation of metal surface is assured. Equipment cost is much lower —and the Ajax handles more work for a given amount of floor space than any other method. Ajax Reprints 62 and 63 gladly sent on request.

LOW- AND HIGH-CARBON STEELS

This typical Ajax installation process anneals 1200 lb. 18-gauge wire an hour in only 58 feet of floor space.

STAINLESS STEEL

Annealing fine gauge nickel-chromium wire at 1950°F. Clean wire surface eliminates conventional pickling operations.



- **TOPS for WIRE PATENTING, too!**
- **IDEAL FOR DESCALING** hot-rolled stainless and alloy steel wire and other shapes employing either the Dupont sodium hydride or the Hooker Electrochemical Virgo bath.

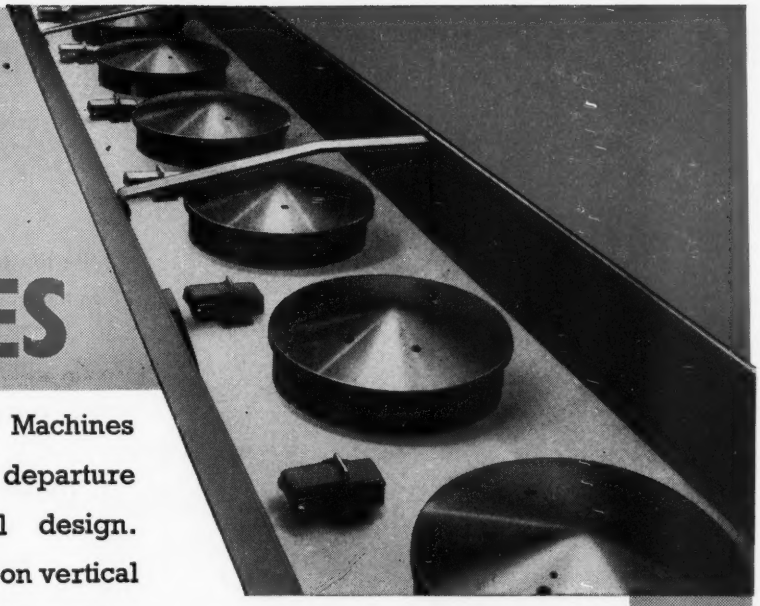
Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

AJAX electric SALT BATH furnaces

OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

AJAX ELECTRIC CO., Inc., 928 Frankford Ave., Philadelphia 23, Pa.

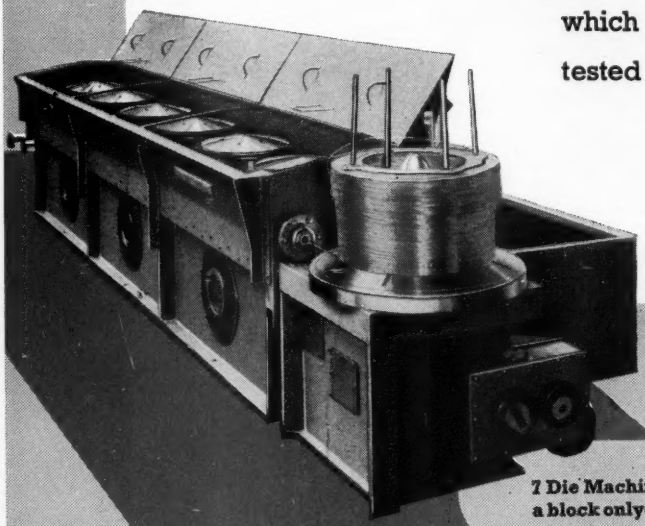
TANDEM ROD MACHINES



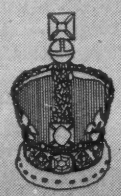
Our Tandem Rod Machines are a complete departure from conventional design. Drums are carried on vertical shafts and are totally submerged, with the dies, in the drawing lubricant.

A view inside the drawing bath showing total submersion of the drums and dies when in operation.

As usual, we offer machines which have been thoroughly tested IN PRODUCTION. Every detail in design which assists lowering of costs and raising of output has been embodied.



7 Die Machine finishing on a block only—18" diameter



MADE IN BRITAIN

MARSHALL RICHARDS MACHINE CO., LTD.

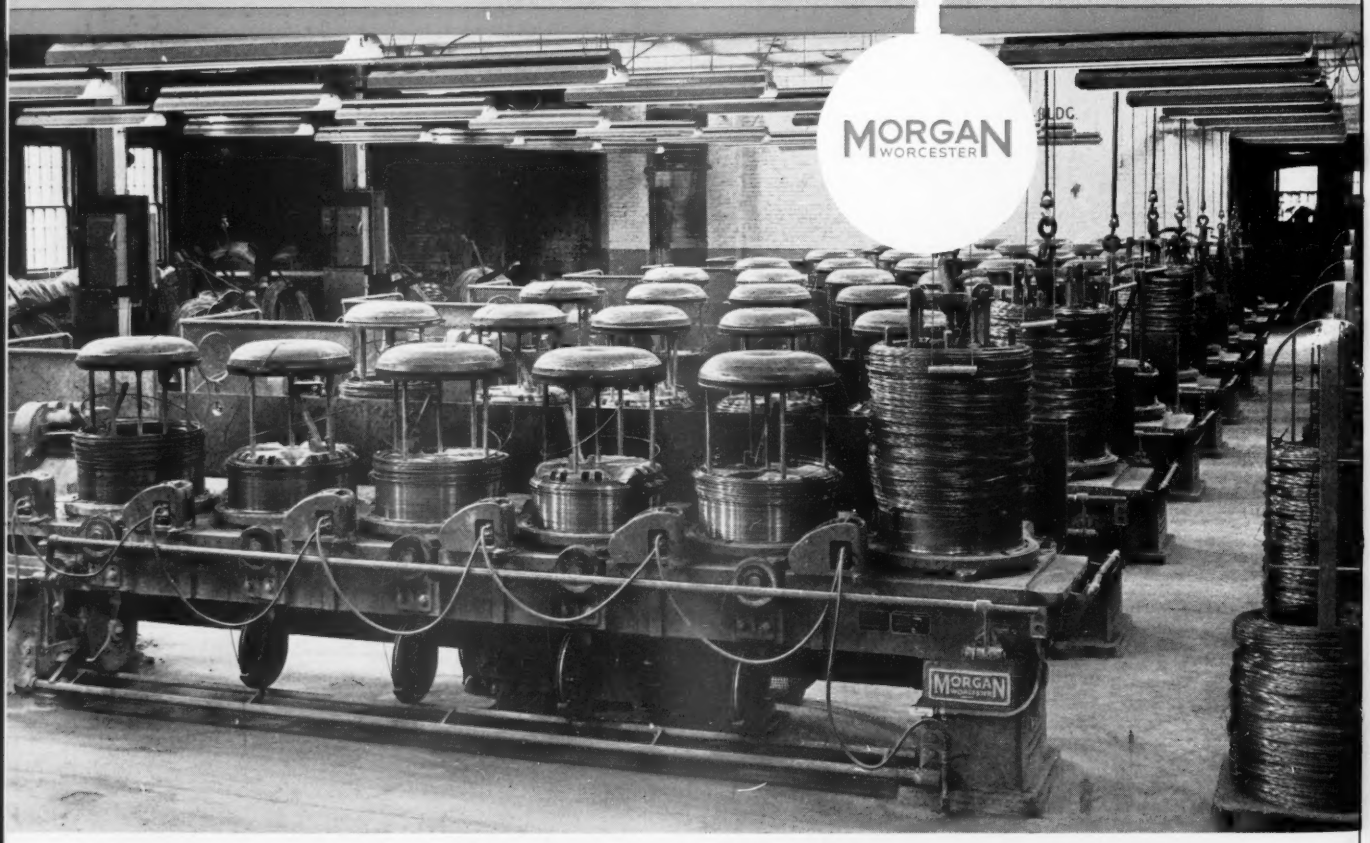
CROOK • COUNTY DURHAM • ENGLAND

Outstanding Results

Recently we announced the results of a series of scientific tests on the temperatures of wire while being drawn. The tests showed the results of reducing wire temperatures by air cooling to be outstanding.

Recent installations of new Morgan-Connors are confirming—in actual mill production—the results shown by our tests.

Photo courtesy Wickwire Spencer Steel Division, Palmer, Massachusetts



MORGAN-CONNOR
WIRE MACHINES

WM76

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASSACHUSETTS

WIRE AND WIRE PRODUCTS*

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A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 28 SEPTEMBER, 1953 No. 9

Designated as Official Publication By The Wire Association

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FLANGED STEEL TRAVERSES

. . . offer wire rope users and manufacturers rugged construction, simple 4-step reel assembly and long life—the same qualities that have made them first choice of thousands for wire and cable reels.

Niles Flanged Steel Traverses are manufactured in a wide range of sizes up to 56" diameter and 48" traverse... in plain, painted and hot dip galvanized finishes. The special "Reinforced Type" has *extra strength* where it is needed most—at bolt holes and base of the flange—yet saves weight through use of lighter gauge steel. Width of flange and number of bolt and drain holes are furnished to your specifications. Available for prompt delivery. Write for prices.

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REPUBLIC STEEL CORPORATION
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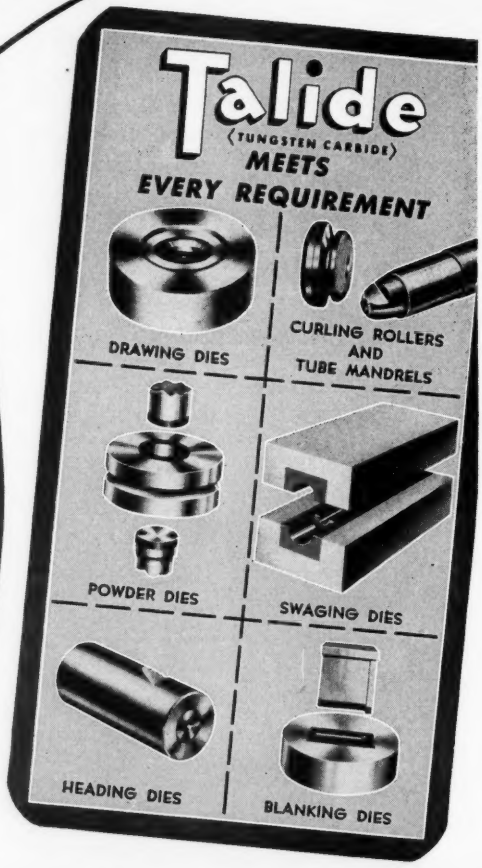
LONG, UNINTERRUPTED SERVICE WITH RUNS OF A MILLION PIECES OR MORE

TALIDE CARBIDE DIES outwear steel dies on most applications by at least 50 times. The 79 Rockwell "C" hardness (hardest steel 68 "C") of Talide Nibs assures long runs before redressing. The Alloy Steel Case, plus our special mounting process, is accurately calculated to withstand severest drawing pressures and increase both transverse and longitudinal nib strength. A diamond-lapped Micro-Inch Finish imparts a lustrous finish to drawn parts and minimizes pickup, scoring and scratching. 750,000 p.s.i. compressive strength and 95,000,000 p.s.i. modulus of elasticity (3 times steel) holds tolerances to .0001". You have few rejects. You can triple production runs with **Talide Carbide Dies** on your present equipment. For further information, write **Metal Carbides Corporation, Youngstown 7, Ohio.**



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Prompt attention is given to all inquiries. Send us prints or parts for estimating and recommendation.
Ask for Catalog 52-G.

METAL CARBIDES CORPORATION
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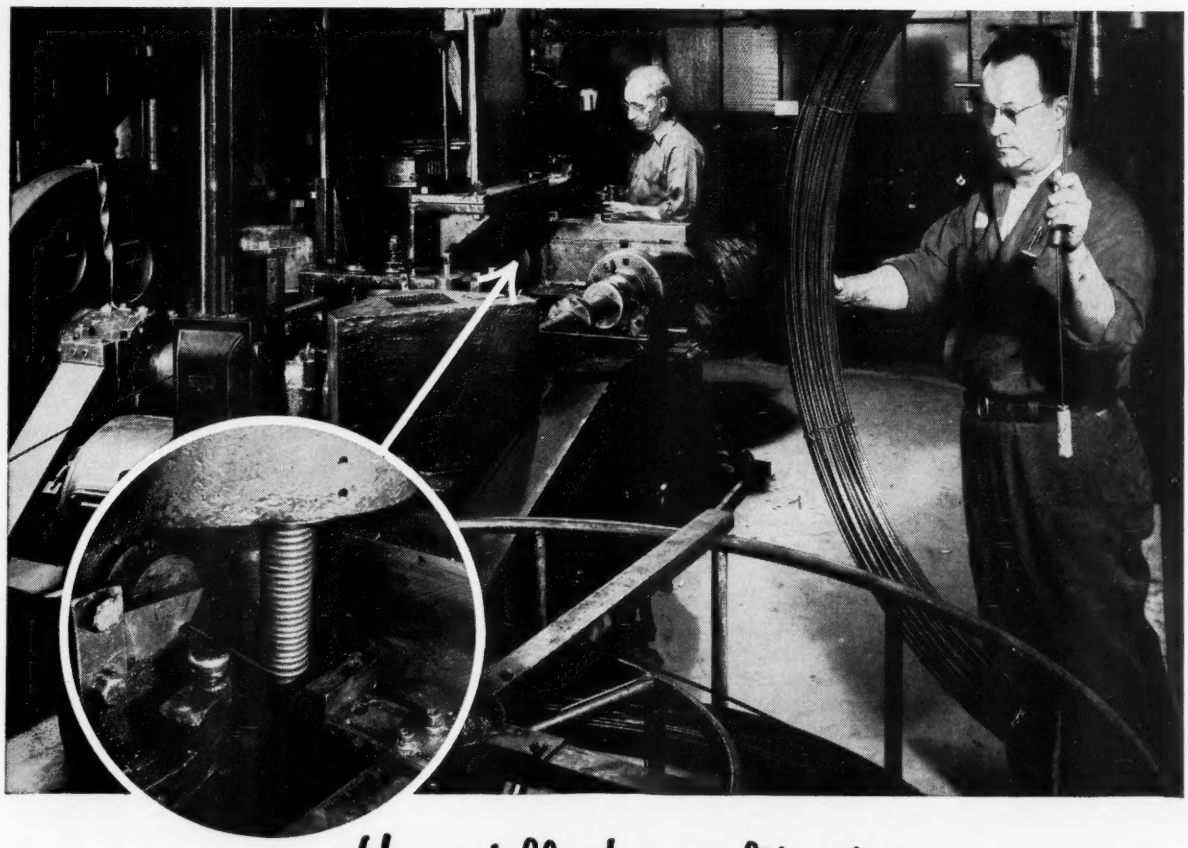
TALIDE
YOUNGSTOWN 7, OHIO

SINTERED CARBIDES · HOT PRESSED CARBIDES
TUNGSTEN ALLOY HEAVY-METAL
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY



Users tell the quality story

To Produce Hundreds of Thousands of High-Quality Specialty Springs, the U. S. Steel Wire Spring Company Insists on *Uniformity* in Oil Tempered Spring Wire

Turning out fine quality custom-made springs of unique design for auto and farm machinery manufacturers has been the specialty of this well-known Cleveland, Ohio, spring maker for over 35 years . . . he knows the secrets of quality production. One of these secrets is uniformity of wire within grade specifications.

For example, the Sleeper-Hartley automatic torsion machine above makes a .243″ oil tempered spring wire into some 4,400 hood hinge springs for automobiles in a day. The wire must work smoothly in production, give sturdily built springs that prove out individually under tough usage.

To meet the stiff requirements for this job, and for hundreds of other applications, U. S. Steel Wire Spring Company uses hundreds of tons of Pittsburgh Steel's Oil Tempered Spring Wire a year in a broad range of sizes. They know they can depend on it to make long runs, avoid production delays, reduce rejections, and give good service.

If you are not using Pittsburgh Steel Oil Tempered Spring Wire in the manufacture of your springs and wire specialties, why not get complete information now? Write Department WW, Pittsburgh Steel Company, Grant Building, Pittsburgh 30, Pa.

Pittsburgh Wire

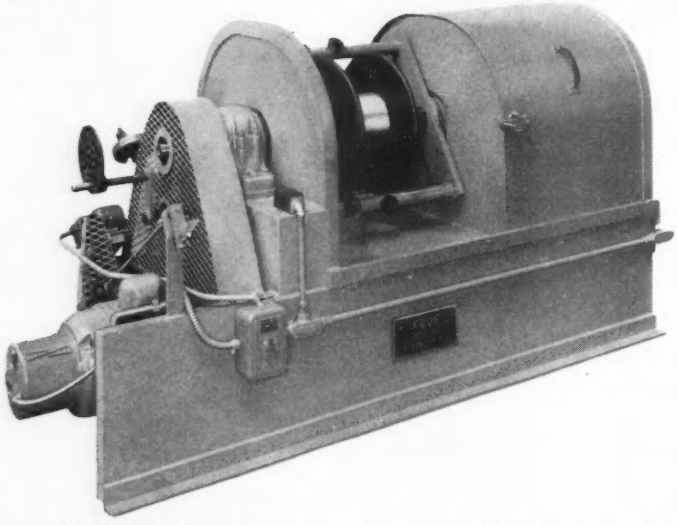
a product of **Pittsburgh Steel Company**

CONCENTRIC . . .
BUNCH STRANDING

DO YOU HAVE TROUBLE PRODUCING BUNCHED WIRE WITH THE SMOOTH CONCENTRIC QUALITIES OF STRANDED WIRE? IF SO THE COOK HIGH SPEED CONCENTRIC BUNCH STRANDER IS THE ANSWER TO YOUR PROBLEM.

HERE COMBINED IN A SINGLE MACHINE ARE THE ADVANTAGES OF BUNCHER AND STRANDER. THE COOK BUNCHER GIVES YOU SPEED AND CONCENTRICITY WITH NO SACRIFICE IN SPACE.

Shown below is the Cook Buncher Model B-H-21 which incorporates such worthwhile features as . . .



HIGH SPEED
(1400 twists per minute)

SINGLE TWIST FLYER

ELECTRONIC LAY CONTROL

LARGE TAKE-UP REEL
(350 pounds capacity)

This COOK BUNCHER has successfully formed bunched strands of 7, 10, 16, 19, 26, 41, and 65 wires with such concentricity as to enable its passage through an extruding die of only 1 mil clearance. In addition such constructions as 27/36 and 41/36 have been bunched at high speed with perfect concentricity on this versatile machine.

COOK MANUFACTURING COMPANY has a complete line of bunching equipment to accommodate the following reel sizes:

B-H-8	8" x 6"	Capacity	40 lbs.
B-H-12	12" x 8½"	"	100 "
B-H-21	21" x 8½"	"	350 "
B-H-22	22" x 11"	"	500 "
B-H-24	24" x 11"	"	700 "

Write today for descriptive literature giving details of construction and performance of this high speed concentric bunching machine.

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• Wire Drawing Machines • Bunchers • Twisters • Wire String-Up Machines • Enameling Take-Ups and Pay-Offs
• Enameling Machines • Cabling Machines • Spoolers • Tinning Take-Ups and Pay-Offs • Tinning Pots
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COOK MANUFACTURING COMPANY

50 EAST 25th STREET **PATERSON 2, N. J.**

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IF you're having steel wire trouble, we'd like to have the chance to help you. Our metallurgists are real experts at solving problems involving the use of manufacturers wire. Sometimes they can suggest the use of a different wire that saves time, or money—or both—for the manufacturer. Sometimes they can come up with a change in fabricating technique that results in a real cost reduction. And, if you're in difficulty because you need a special kind of manufacturers wire, our staff will work with you to develop a new wire that will meet your exact specifications.

We've had more than a century of wire-making experience. Today, as the "Wire Headquarters of the World" we supply our customers with more than 400 different types of U·S·S American Manufacturers Wire . . . and all of it is of uniformly high quality.

Consultation is without charge or obligation—just call our nearest sales office.

If you make it of wire... make it of the best!

U·S·S AMERICAN MANUFACTURERS WIRE

AMERICAN MANUFACTURERS WIRE

AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

AMERHEAD—*uniform heading wire.*

AMERSTITCH—*extra-tough metal stitching wire.*

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COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

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for faster, more uniform wire production,

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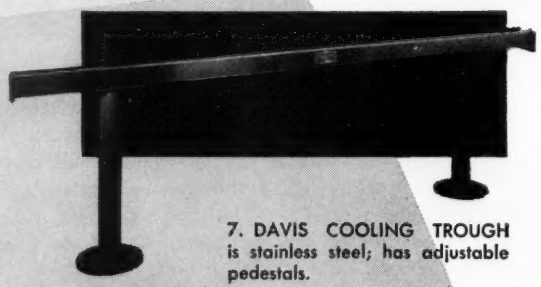
Teamwork in machinery is just as important as teamwork in manpower. All Davis-engineered wire-covering equipment is designed to function hand-in-hand with *your* extruder . . . from the Pay-off right thru to the Take-Up . . . to co-ordinate your insulating operations into one smooth production line that SPEEDS OUTPUT, makes a better, MORE UNIFORM PRODUCT, and BOOSTS YOUR PROFITS!



1. DAVIS PAY-OFF is simply yet ruggedly built for wide range of reel sizes. Constructed for long, dependable service, its automatic control prevents wire overtravel . . . stops when wind-up stops!

2. DAVIS CAPSTAN design improvements give you lower cost. Use of welded steel also effects weight-saving. Improvements include aluminum alloy wheel (15, 30 or 36"), stainless steel cooling tank and enclosure. Single or dual for heavy pulling operations. In speeds to match your needs.

3. DAVIS CONTROL PANEL is electronically operated; enables presetting capstan speeds and wind-up tension accurately over a wide range. Controls quality and uniformity of wire; saves time and materials.

4. DAVIS CV TYPE SPARK TESTER tests insulations on continuous vulcanizing or plastic extruding machines. Sensitive, it spark-tests wire up to 1200 feet per minute. It signals and counts insulation faults. Test volts 3,000 to 15,000; 6,000 to 30,000 on standard units.

7. DAVIS COOLING TROUGH is stainless steel; has adjustable pedestals.

5. DAVIS COUNTER, with totalizer, is simple to set and guaranteed accurate. Self-contained; easily moved. For wire and cable sizes .010 to 1½".

6. DAVIS TAKE-UP provides speed tension and control with a minimum of operator supervision. It has its own individual drive, and adjustable traverse for various wire and cable sizes and reel widths.

All Davis equipment is assembled, tested, and delivered ready for use; is ably engineered, fabricated of finest materials by wire mill craftsmen for long life and thorough satisfaction. Your inquiries are invited. Write for literature.

Davis ELECTRIC CO.
WALLINGFORD, CONN., U.S.A.

HARNESS TESTERS ★ PAY-OFFS ★ TRAVERSES

SPARK TESTERS ★ SPOOLERS ★ TAKE-UPS ★ CAPSTANS

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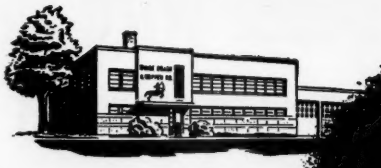
DAVIS WIRE & CABLE EQUIPMENT



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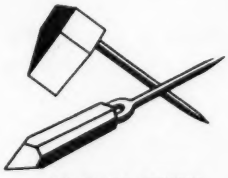

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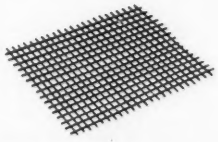
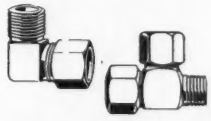
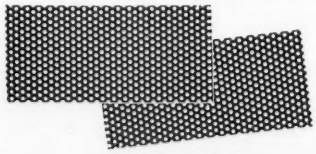


INDUSTRIAL WIRE CLOTH and BRASS STRAINER CLOTH



INDUSTRIAL and AUTOMOTIVE FITTINGS



PERFORATED METAL IN BRASS, BRONZE and COPPER

BEARING BRONZE BARS

CALL US FOR ANYTHING from Bearing Bronze Bars to Brass or Bronze Bolts . . . or any other brass or copper item for maintenance, repair, operating or production.

Twenty-four Chase warehouses are located in major industrial centers from coast to coast. Phone the one nearest you. We can usually fill your orders from stock.

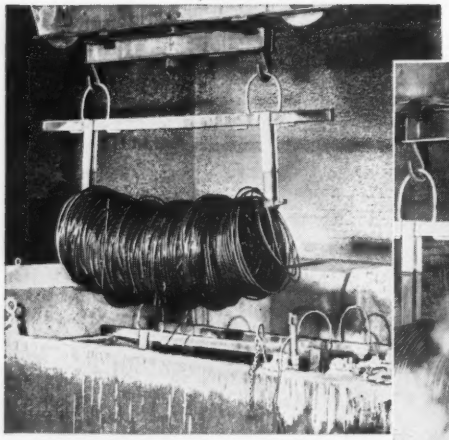
Chase® BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

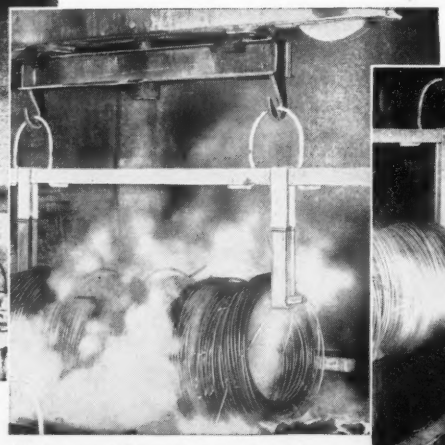
The Nation's Headquarters for Brass & Copper

Albany†	Chicago	Denver†	Kansas City, Mo.	Newark	Pittsburgh	San Francisco
Atlanta	Cincinnati	Detroit	Los Angeles	New Orleans	Providence	Seattle
Baltimore	Cleveland	Houston	Milwaukee	New York	Rochester†	Waterbury
Boston	Dallas	Indianapolis	Minneapolis	Philadelphia	St. Louis	(†sales office only)

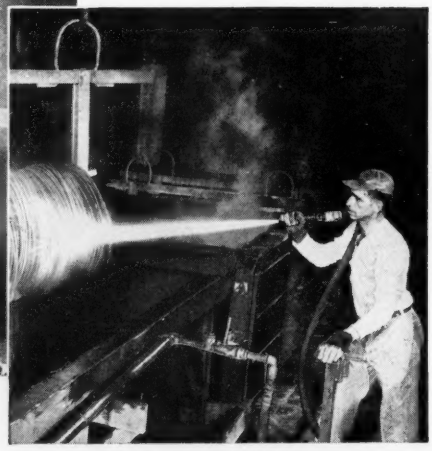
Over 5 tons of carbon steel wire thoroughly descaled within one hour!



A yoke of 5/32" dia. wire is lifted from the hydride tank. (Up to 3 yokes can be treated at one time in this tank. Working dimensions are 7' x 8' x 5' 6".)



Water quench blasts off loosened scale.



Thorough descaling complete with final rinse.

DU PONT SODIUM HYDRIDE DESCALING PROCESS

By switching to Du Pont's efficient and simplified process, a large eastern steel manufacturer was able to triple descaling capacity—with *less than half* the man power!

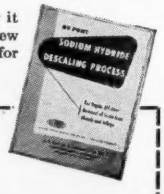
These and other important savings are possible with Sodium Hydride Descaling because elaborate scale breaking operations are eliminated entirely, yet uniform descaling is accomplished in the shortest possible time—no retreatments needed! And because dissimilar metals can be effectively treated in the same bath, this steel mill finds the Du Pont process ideal for descaling their quality carbon and stainless steel products indiscriminately at production line speeds.

Costly rejects due to pitting or loss of gauge are avoided . . . there's never any danger of base metal attack no matter how long the work remains in the sodium hydride bath! Dimensional accuracy is maintained, and subsequent drawing operations can be carried out to closer tolerances. Die life, too, is increased.

Find out how Du Pont's Sodium Hydride Process can improve your descaling operations. Just get in touch with our nearest district office or send in the coupon below.

DISTRICT AND SALES OFFICES: Baltimore • Boston • Charlotte • Chicago Cincinnati • Cleveland • Detroit • Kansas City* • Los Angeles • New York Philadelphia • Pittsburgh • San Francisco. *Barada & Page, Inc.

More detailed information about the process—how it works, what it can do for you—can be found in our new book. Call our nearest office or use the coupon below for your copy.



DU PONT
Sodium hydride process for positive descaling

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department WW-9
Wilmington 98, Delaware

Please send me more information about the Du Pont Sodium Hydride Descaling Process: advantages, applications, equipment used. I am interested in descaling_____

_____

*Name*_____ *Position*_____

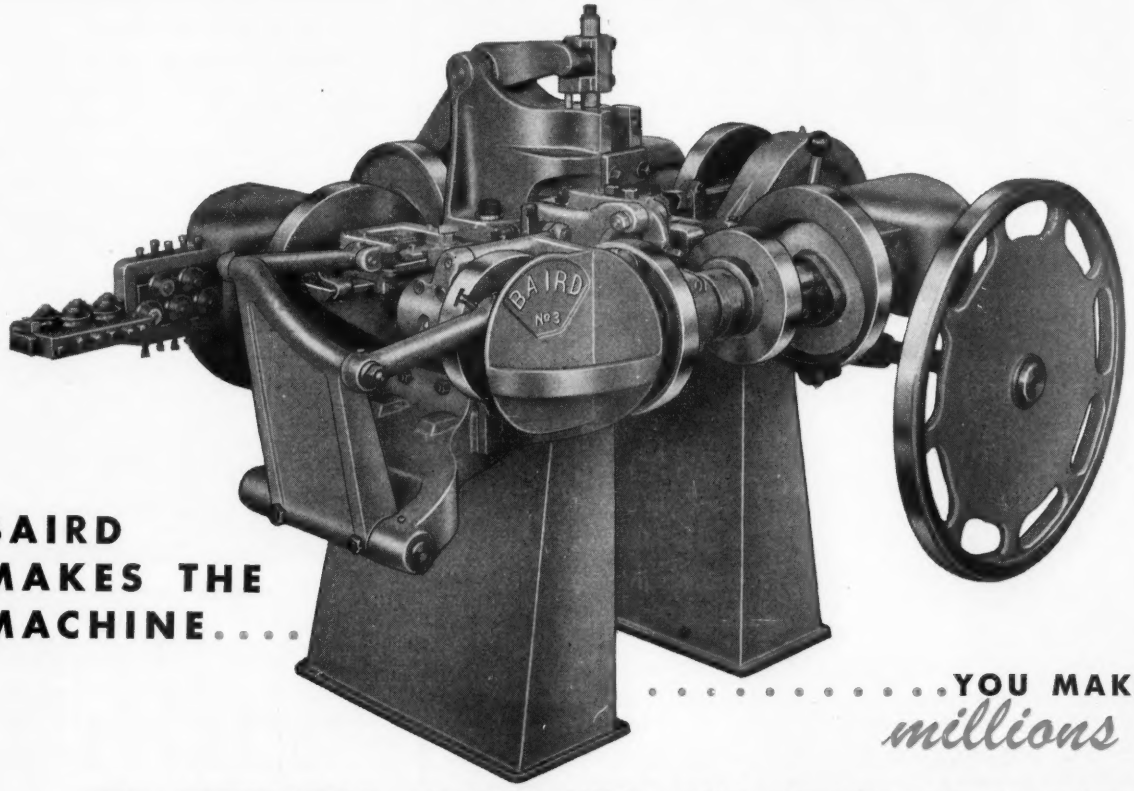
*Firm*_____

*Address*_____

*City*_____ *State*_____

ASK BAIRD ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD MAKES THE MACHINE. . . .

. . . . . YOU MAKE *millions*

. . . OF ACCURATELY FORMED WIRE AND RIBBON METAL PARTS

The Baird automatic Four-Slide Machine produces an extremely wide variety of articles made of any commercial wire . . . round, half-round, square, or flat . . . at highest speeds. It takes coiled wire from a reel, straightens, feeds, and cuts off the required length . . . then forms and ejects the part produced. Eight sizes handle shorter wire lengths; three sizes take longer lengths to 32½".

By means of special attachments, the versatility of the machine is further extended to include the making of round wire and ribbon metal rings, secondary cut-offs, lettering, and other operations.

The detailed and complete story, with specifications, is told in our new Four-Slide Bulletin. If you require hundreds of thousands or millions of wire units to ½" dia., or flat ribbon metal products to 1½" wide . . . this is your profit-making machine. Send for bulletin.

3BA53

the BAIRD MACHINE COMPANY
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

INTRODUCING

an improved dyed glass yarn that costs less to use!

Now you can offer all the performance extras provided by glass yarn *. . . at a cost no higher than that of cotton or rayon . . .* by using the new, improved, Treatment 023 dyed yarn just perfected by Owens-Corning Fiberglas Corporation!

Treatment 023 Fiberglas* yarn is priced for economy — permits lower production costs because of greater coverage per pound, less absorption of lacquer. Involves fewer package changes, fewer yarn breaks because Fiberglas yarns are stronger . . . give greater yield per package.

The new Fiberglas yarn has superior light fastness characteristics — is available in all standard NEMA colors. Note, too, the improved heat and bleed resistance shown by the tables on the right.

For samples and further details, consult your nearest Owens-Corning Fiberglas branch office, or write direct to Owens-Corning Fiberglas Corporation, Dept. 875, 16 East 56th St., New York 22, N. Y.

HEAT RESISTANCE
Treatment 023 Yarn

COLOR	400° F. 24 Hrs.	300° F. 100 Hrs.
Red	Fair	Good
Orange	Fair	Good
Yellow	Fair	Good
Green	Fair	Good
Blue	Fair	Good
Purple	Good	Good
Brown	Fair	Good
Gray	Fair	Good
Black	Good	Good
Oak Tan	Fair	Good

BLEED RESISTANCE
Treatment 023 Unlacquered Yarn

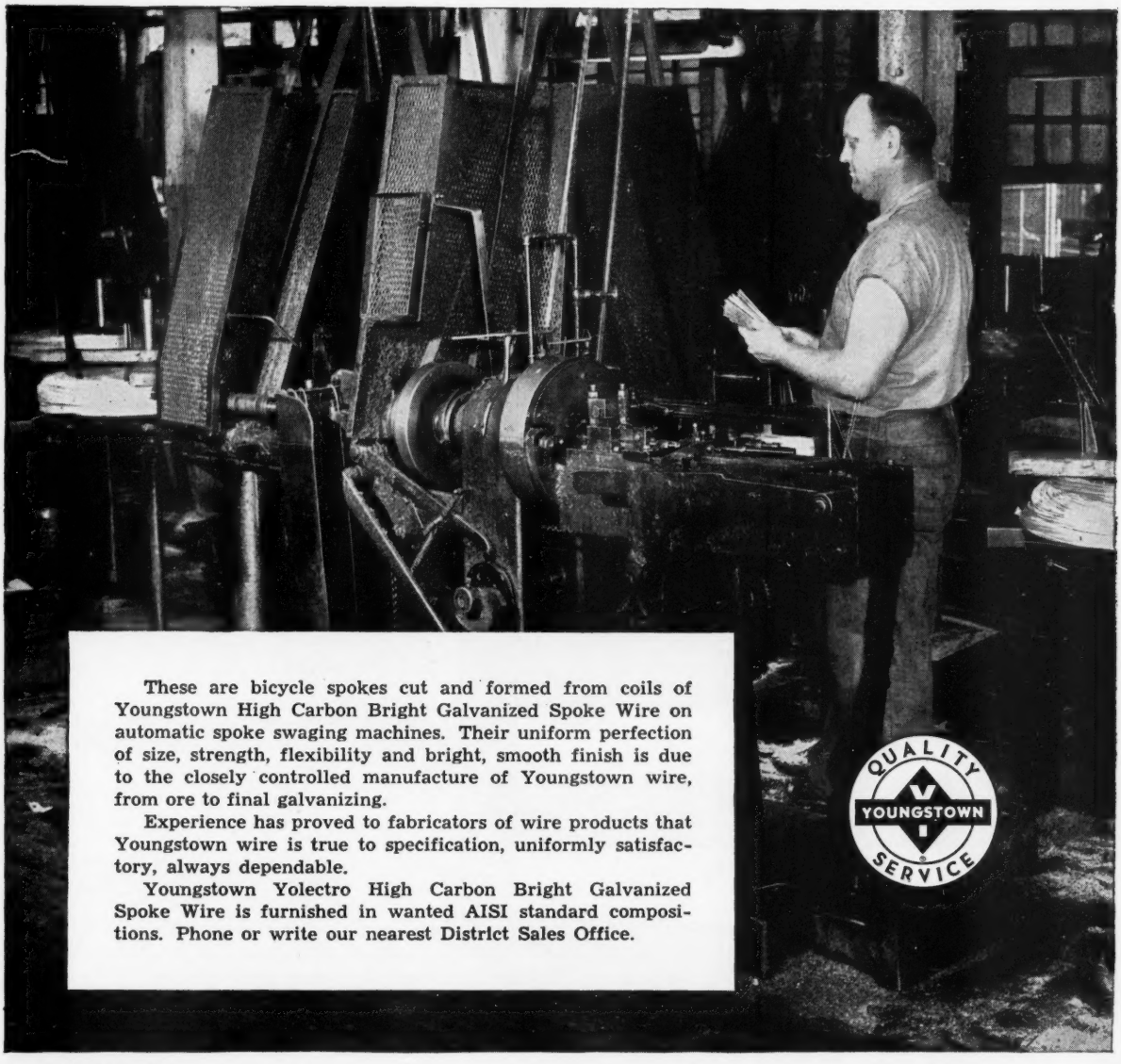
COLOR	Ethanol	Toluene	Salt Water	Prestone	Zerone	Trimethyl Pentane	SAE 20 Motor Oil
Red	F	G	P	P	G	G	G
Orange	F	G	P	P	G	G	G
Yellow	G	G	G	P	G	G	G
Green	F	G	G	F	G	G	G
Blue	G	G	F	P	G	G	G
Purple	G	G	F	F	G	G	G
Brown	G	G	G	F	G	G	G
Gray	G	G	G	G	G	G	G
Black	G	G	G	G	G	G	G
Oak Tan	G	G	—	—	—	—	—

G = Good F = Fair P = Poor

... made with OWENS-CORNING FIBERGLAS TM REG. U.S. PAT. OFF Yarns

*Fiberglas is the trade mark (Reg. U.S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.

YOU GET BRIGHTER, MORE FLEXIBLE SPOKES WITH YOUNGSTOWN HIGH CARBON SPOKE WIRE



These are bicycle spokes cut and formed from coils of Youngstown High Carbon Bright Galvanized Spoke Wire on automatic spoke swaging machines. Their uniform perfection of size, strength, flexibility and bright, smooth finish is due to the closely controlled manufacture of Youngstown wire, from ore to final galvanizing.

Experience has proved to fabricators of wire products that Youngstown wire is true to specification, uniformly satisfactory, always dependable.

Youngstown Yolectro High Carbon Bright Galvanized Spoke Wire is furnished in wanted AISI standard compositions. Phone or write our nearest District Sales Office.

QUALITY YOUNGSTOWN SERVICE

Youngstown HIGH CARBON SPOKE WIRE

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RAILROAD TRACK SPIKES

STEELSKIN Lubricants

—and how to use them...

No. 1 of a series

This is the first in a series of advertisements cataloging the complete line of Steelskin Lubricants. Keep this for handy reference.

PRODUCT	SHIPPING INFORMATION	USES
CXH POWDER	300# Net FIBER DRUM	For drawing rod and wire (coated with lime or STEELSKIN W-Coating) for springs, nails, galvanizing, tire bead, rope, poultry netting, screen cloth, etc.
REDSKIN CRYSTALS	400# Net FIBER DRUM	For the economical production of an adherent and uniform copper-coating on both high- and low-carbon wire without the use of an electric current.
W-BRIGHT GREASE	440# Net STEEL DRUM	A one-hole grease for producing extra-clean, extra-bright finishes using a light-lime coating.
# 5 POWDER	230# Net FIBER DRUM	A general-purpose, dry-drawing lubricant for limed wire and rod, both high- and low-carbon. The finished coating is more readily removed.
JD PASTE COMPOUND	440# Net STEEL DRUM	An emulsion-type lubricant for wet-drawing steel—liquor-finished or galvanized, copper, bronze, brass, and other alloys.
SS POWDER	300# Net FIBER DRUM	Specially developed for drawing stainless steel.
GF POWDER	260# Net FIBER DRUM	A recent development for drawing heavily-limed wire going to ultra-high-speed nail machines.
GALVASEAL WAX	440# Net STEEL DRUM	Used at low concentrations in the last pan of the galvanizing unit to provide a protective film. It also helps form more compact bundles.

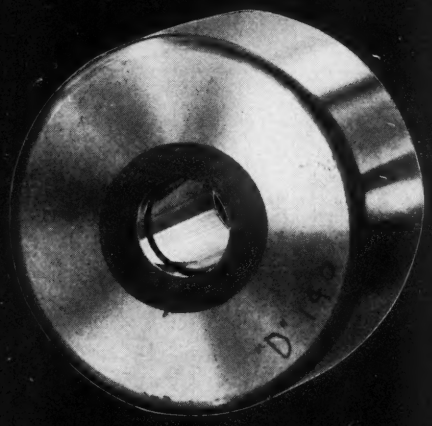
Steelskin LUBRICANTS

R. H. MILLER

Company, Inc., Homer 1, N. Y.

SOAPS AND COMPOUNDS FOR WIRE DRAWING, TUBE DRAWING, DEEP DRAWING AND STAMPING.

free cutting diamonds for the right finish faster



HYPREZ

High Precision DIAMOND COMPOUNDS

Fast, free, cutting action is assured by pure diamond powders, precisely graded — permanently, uniformly distributed in a scientifically formulated vehicle. Laboratory research and controls maintain the continued superiority of Hyprez Diamond Compounds.

Ask for a free demonstration

or technical bulletin No. W-1253

HYPREZ DIVISION

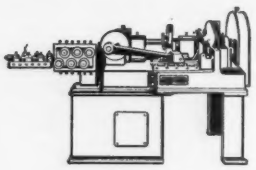
ENGIS EQUIPMENT COMPANY, CHICAGO 5, ILL.

431 SOUTH DEARBORN ST.

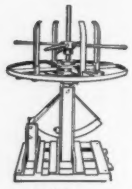
SHUSTER Since 1866

WIRE STRAIGHTENERS & CUT OFF MACHINES

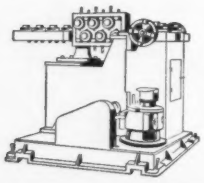
ACCURATE AUTOMATIC AND ECONOMICAL



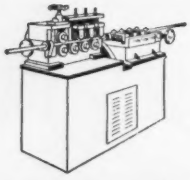
SLIDE FEED STRAIGHTENERS
3/8" x 10"; 9/16" x 10"



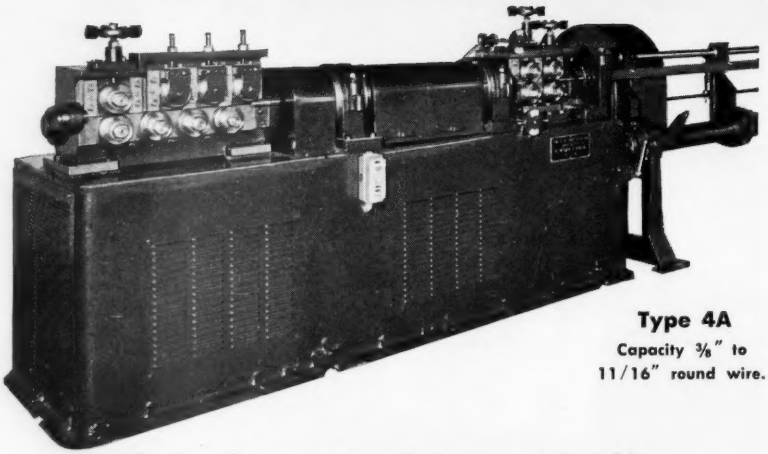
REELS
400 lbs.



FEED STARTER AND STRAIGHTENER
Max. 5/8" dia.



TUBE AND BAR STRAIGHTENER
7/32" to 5/8" bar 1" tubing



Type 4A
Capacity 3/8" to 11/16" round wire.

Round wire, flat, square or hexagon stock, tubing—all are straightened and cut faster, more accurately and more economically because of SHUSTER automatic features.

Each operation of the machine is perfectly integrated, delivering straight, exact lengths with square, clean-cut ends.

There is a SHUSTER for every wire straightening job from .025 to 11/16" diameter. Over 30 models to select from. Write today for our recommendation, describing your needs. No obligation whatever.

Mfd. by **METTLER MACHINE TOOL, INC.**
132 W. Lawrence St., New Haven, Conn.
Representatives in all principal cities and in foreign countries.
NEW YORK OFFICE: Eleven Broadway, Tel.: WHitehall 4-5480

Technical Data on Request

Mettler Machine Tool, Inc.
132 W. Lawrence St., New Haven, Conn.

Gentlemen: Please send us technical data.
We use wire from ..... " to ..... " dia. in lengths from ..... to .....
Name: .....
Company: .....
Address: .....

SHUSTER *Since 1866*
Automatic WIRE STRAIGHTENING AND CUTTING MACHINES

When precision finish is important

...start with the precision abrasive

ELGIN DIAMOND

At ALLIED MANUFACTURING COMPANY of Worcester, Massachusetts, a leading producer of special carbide dies and tools, they demand precision finishes . . . and they rely on Elgin Diamond in DYMO-C*, the precision diamond abrasive! Precision graded for absolute particle uniformity, Elgin Diamond assures uniform, predictable results with maximum cutting speed. Operators like it, too, because it comes ready to use—there is no need for mixing or preparation of any kind. Whatever your finishing need, Elgin offers a full range of Bureau of Standards grades, each distinctly color identified to give you finer finishes, faster. Every day, more and more leading producers find that . . .

Better results begin when you finish with diamond...

ELGIN DIAMOND

ABRASIVES DIVISION

ELGIN NATIONAL WATCH COMPANY

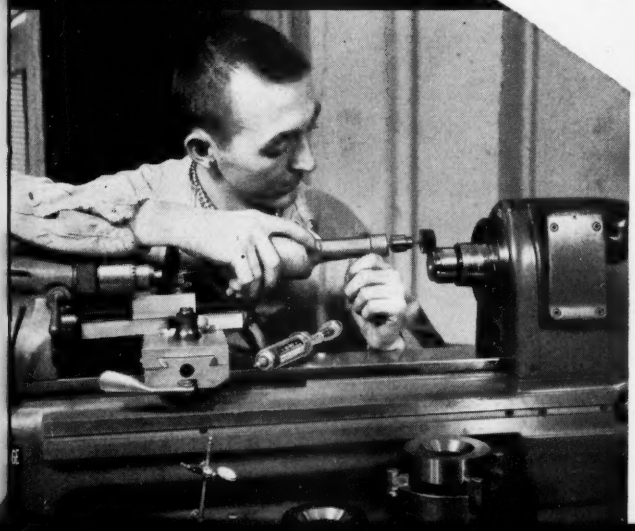
ELGIN, ILLINOIS

Dept. G

Ask for a free demonstration!

* C for Carbides.

Here, a carbide curling punch for forming the bead on flashlight casings is precision finished on a rotary felt wheel at ALLIED. ELGIN DYMO-C, grade 30, is used in this operation for accurate sizing in less time.



This ALLIED operator is using a rotary felt bob and ELGIN DYMO-C to polish carbide sizing pins. Again, Elgin Diamond meets ALLIED'S requirements for consistent accuracy and flawless finishes—every time!

SERVICE
ON
WIRE DRAWING COMPOUNDS

On a subject as complex as wire drawing lubricants and their applications, "SERVICE" can mean much or little, depending on who attempts to render it.

STANDARD'S field men are all wire drawing *specialists,* equipped with that experience and knowledge of the practical side of wire drawing that enables men to render the competent service so sorely needed.

STANDARD, for instance, has some 75 compound formulas, each designed for a special application. Even for bright wire, STANDARD has 5 different compounds. Only competent experts who know wire and lubricant properties can advise where and how to use them for best results.

In buying from STANDARD you can ask for and get that plus value called "SERVICE." This service will help you select the *right* compound for the wire to be drawn and the conditions under which you operate.

STANDARD'S specialists are ready and able to serve you.

You Are Invited to Come to "Service" Headquarters on Your Wire Drawing Lubricant Problems

Call or Write Headquarters or Any Standard Service Center:

Bruce W. Siemon
2400 Morrow Pl.
Pittsburgh 34, Pa.

John A. Moritz, Jr.
4600 W. Ferdinand St.
Chicago 44, Ill.

Earl A. Bowers
5536 Lisette
St. Louis, Mo.

Charles P. Orr
Caledonia Park
Fayetteville, Pa.

Standard Industrial
Compounds Co.
Millbury, Mass.
Arthur J. O'Mara

STANDARD INDUSTRIAL COMPOUNDS COMPANY has pioneered most of the outstanding contributions to better wire drawing through better lubricants. Consult with STANDARD for the solution of your difficult problems. We welcome your inquiries.

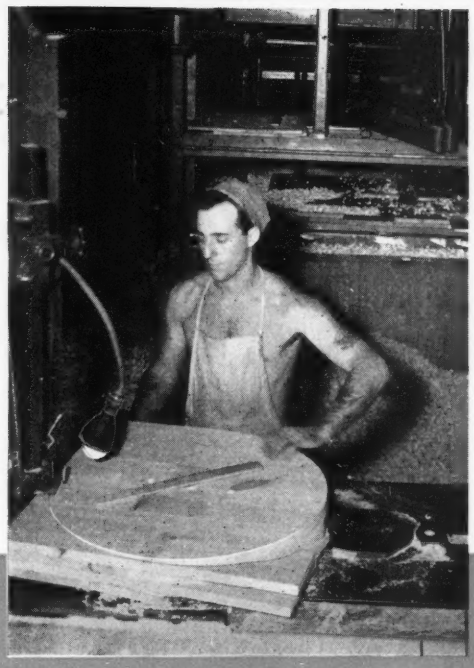
wire drawing lubricants *Standard* INDUSTRIAL COMPOUNDS CO., INC.

4600 WEST FERDINAND STREET
CHICAGO 44, ILLINOIS

ARE YOUR WOOD REELS PRECISION MADE?

Reels made by Bridge are. They're manufactured in a modern plant that is wholly devoted to making only one product—WOOD REELS.

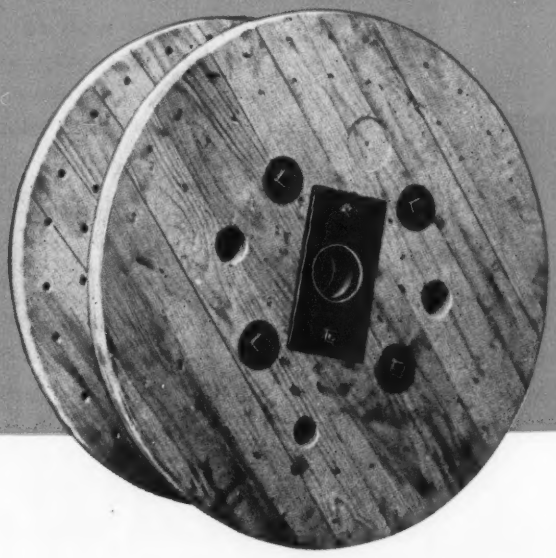
Straight-line production methods and automatic tools and jigs assure you of well and accurately made reels that conform exactly to your specifications. That's why they are of uniform high quality, as well as being low in cost. Try BRIDGE REELS!



Right: Cutting out reel head.

YOUR SPECIFICATIONS FOLLOWED

Every wire mill has its own reel specifications. Bridge's production system is designed to meet them rigidly and to furnish you with strong reels that will withstand severe handling. If you specify a delivery date—that will also be met on schedule. BRIDGE gives you what you order.



PLUS A SPEEDY SHIPPING SERVICE

Bridge delivers by truck to your door within a radius of 200 miles from the plant. Fast freight will bring you Bridge reels in 5 days or less east of the Mississippi.

WOOD REELS FOR SHIPPING AND SHOP

12" to 96" in diameter; knocked down or assembled; returnable or non-returnable; wood heads for steel drums.

BRIDGE
MANUFACTURING CO.
HAZARDVILLE, CONN.

Phone
Thompsonville, Conn.:
Riverview 9-8308

Let us quote on your reel needs. Send your specifications. Better yet, visit our plant and see how and why our reels are made so well at so low a cost.

WIRE and WIRE PRODUCTS

reaches many prospects

YOUR SALESMEN DON'T KNOW!

No matter how big you are, the odds are you don't know all your actual prospective customers.

If your company is small, it is even more important to be "calling" on your prospects and customers regularly through advertising.

Your advertising in Wire and Wire Products will be seen by many people in the plants you wish to "sell" whom your salesmen never would see, yet who specify, actually buy or who influence decisions on products to be purchased. Your advertising is bound to be of immeasurable value to you, too, in paving the way for a good reception for your salesmen when they do call. And the field's buying power is tremendous!

WIRE AND WIRE PRODUCTS circulation, is all paid. We have no agents, offer no premiums or make special inducements to get circulation, except the value of the editorial contents in itself—yet our renewals have averaged 97% or better for many years. That's why it is a good and forceful advertising medium for all concerns who have products to sell to the wire industry.

● **GET YOUR SHARE OF THE BUSINESS . . .**

● **ADVERTISE IN WIRE AND WIRE PRODUCTS . . .**

● **SEND FOR ADVERTISING RATES TODAY . . .**

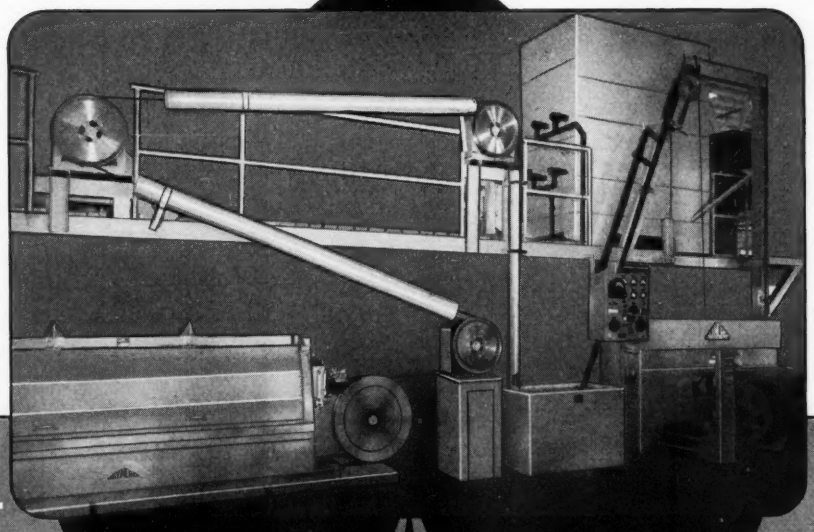
WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

ACE IN THE HOLE

for tomorrow's . . .

COMPETITION



NON-STOP

Copper WIRE DRAWING

ANNEALING and . . .

CONTINUMATIC SPOOLING

SYNCRO®

SYNCRO MACHINE COMPANY
PERTH AMBOY, N. J., U.S.A.
affiliated Company
WINGET - SYNCRO LTD., ROCHESTER - KENT • ENGLAND

Better Machinery for the Wire Industry

For the FINEST Dies...

Specify

DIES... TOOLS... WEAR PARTS... BLANKS...

TELEPHONES: FACTORY and BRANCHES

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BIRMINGHAM, ALA. 4-0377	CLIFTON, N. J. PRescott 7-8610	INDIANAPOLIS, IND. Winthrop 2132	MINNEAPOLIS, MINN. HYland 9511	PORTLAND, ORE. ATwater 9641	SAN FRANCISCO, CAL. YUkon 6-6505
BOSTON, MASS. DEcatur 2-4456	DALLAS, TEXAS Dixon 4038	KANSAS CITY, MO. Baltimore 1700	MOLINE, ILL. Moline 2-3821	READING, PA. Enterprise 1-0551	SCRANTON, PA. Enterprise 1-0551
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The Wire Outlook

The rate of construction of capital goods in the next few years will be an important barometer in our business outlook. Workers who build houses, factories and production machines spend part of their wages for consumer goods, whether food, clothing, cars or household appliances. Capital goods expenditures have been at the highest levels in our history. Unduly high outlays along these lines are just as inflationary as those for war armament and for our government's materiel and international projects.

There is this difference, however, war spending is permanently inflationary, whereas capital goods investments add to the basic real wealth of the nation insofar as they contribute additional facilitiies for the producton of consumer goods. The growing population is likely to make such recent investments useful and call for more as our growth continues. Future decisions on additional construction will be based primarily on our ability to consume the products of present facilities.

Another business indicator is the trend of stock markets. Anticipating the truce, prices declined over a long period, but following it, advanced for two straight weeks, evidencing the faith of traders in the future.

Steel demand for the first time in many years has turned spotty. It is too early to say whether it will become serious. Probably it won't, for the largest consumer of steel, the automotive industry, has cut back its orders only as a result of summer vacations and model changeovers. Nevertheless, for the time being, wire and wiring for this industry will be slow. One large manufacturer of freezing units laid off 5,000 men for two weeks, because of lack of orders. In general, employment levels remain high, but overtime work is being reduced.

The uncertainty of prices has unsettled copper buyers. Increasing imports of African copper, channeled here because of a dwindling European demand, is a contributing factor to the tumbling prices. It has even caused Chilean producers to offer us copper at 28 cents. Meanwhile, buyers have been loathe to acquire stocks, although well-informed sources feel that the bottom has been reached.

Electric wire and cable sales have slowed materially at a time when copper has been becoming plentiful. Wire rope sales are soft, nails are abundant with consumption under normal, and brass mill products sales have slowed. A factor in the poorer sales by domestic producers is the increasing tempo of importations. This is particularly true in the case of nails and brass rod, which are underselling domestic production.

Pressure is off on all types of manufacturers' wire, with low carbon grades in strongest demand. Orders for high carbon specialties about match shipments. Music wire is in better supply. Merchant wire products have slackened in demand, except for bale ties and baling wire, which should continue good through the harvest season. Fastener business is holding up.

The conclusion of a truce of sorts in Korea has taken the pressure off of some types of armament, but since it is necessary for us to maintain large armed forces at various points in the world, as well as to keep the country strong as a deterrent to aggression, there will be little let-up in our production of war materials.

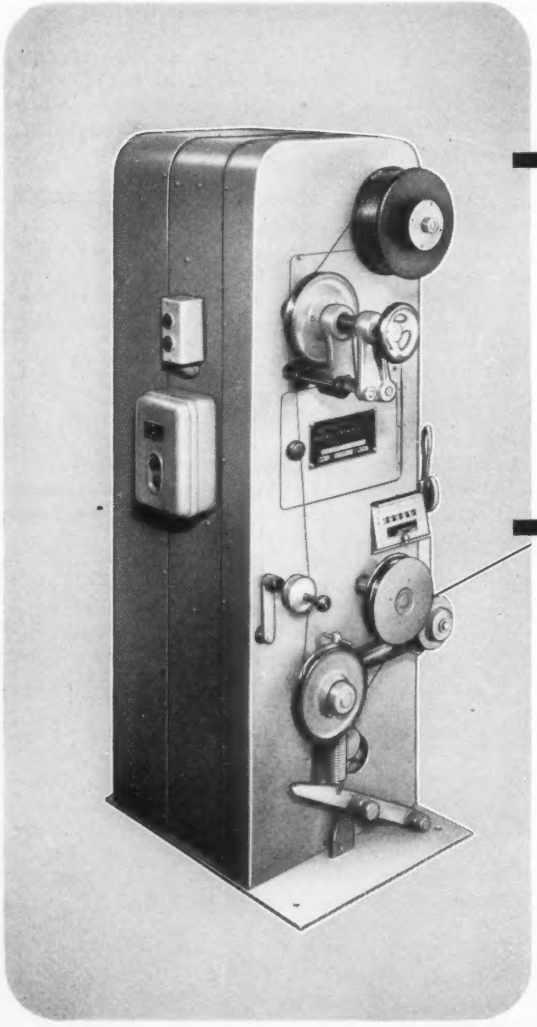
Business leaders are almost unanimous in their convictions that, while we may not set any production records for some time to come, the general level of activity will be satisfactory and the period of readjustment to "peace" will not result in a major slump.

The entrenched bureaucracy inherited by the Republican administration has made it all but impossible to achieve the economies in Federal spending for which we had hoped. Some progress is being made in this direction, but until they have been brought into line, we will not enjoy the promised real relief in taxes, that in itself will contribute substantially to better business.

—from the Editor's Desk

High Speed
RE-SPOOLER

for accurate spooling of enamel, magnet and similar wires.



outstanding features

- Driven by a 1 H.P. motor through differential gearing; one side of differential drives Pay-Off spool and other side drives Take-Up.
- Each unit designed to attach to other units to make a multiple spooler of any number of spindles.
- Constant tension and constant wire speed.

description

The tension on this high speed Re-Spooler is controlled through a tension arm that applies a brake to the Pay-Off or Take-Up as required to keep the wire tension uniform. This permits rapid starting or stopping of the spindles without a change in the wire tension.

The open end spindles are ball bearing mounted and are equipped with integral expanding spool locks. The locks fold into the spindle when the reels are removed. No removable reel locks are required.

The traverse is of the reversing screw type with a load and fire type of reversing mechanism. The lay can be furnished either fixed or variable.

All belts and gearing are enclosed. Lubrication is by pressure fittings. Power shafts are mounted on anti-friction bearing.

The sheaves are large to reduce wire bending to a minimum. As far as possible angular approaches to guide sheaves are avoided.

See Page 923 for a complete listing of JLE Products for the Insulated and Bare Wire Industry.

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WIRE
AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING.

Vol. 28 SEPTEMBER, 1953 No. 9

Proposed New Scales for Expressing The Stiffness of Round and Flattened Wire

by J. M. Thomas
Supervisor Metallurgical Department
Scientific Laboratory
Ford Motor Company
Dearborn, Michigan

and

Dr. L. Thomassen
Professor Chemical and Metallurgical
Engineering Department
University of Michigan
Ann Arbor, Michigan

Mr. Thomas, formerly a Metallurgical Engineer with the Hoskins Manufacturing Company in Detroit, is now Supervisor of the Process Metallurgy Section at the Ford Motor Company. Dr. Thomassen, whose connection is noted above is a consultant for Hoskins. The authors describe what they believe to be a new and improved method of presenting data obtained from stiffness tests on round and flattened wire. The method of correlation illustrated in the paper has been of significant value to Hoskins in its quality control program, and should be of equal value to other wire manufacturing concerns.

Introduction

The stiffness of metal wire is a very important consideration in bending operations. Recent articles by Chubb[1], and Chubb and Eppelsheimer[2] discuss this subject in considerable detail. They also describe the reversed-crimp test for measuring stiffness and give a formula for correlating its results.

★ ★ ★

The ASTM prescribes a method (B-113-41) for testing the stiffness of "Round wire from approximately 0.010 to 0.117 inches in diameter, and rectangular and flattened wire not over 0.117 inch in thickness where the ratio of width to thickness does not exceed 10". This method has been used by the Hoskins Manufacturing Company for the last 13 years to check the stiffness of round and flattened wire (ribbon) manufactured for electrical resistance heating appliances. The particular test unit used has been an RCA Model No. 719-H Wire Stiffness Tester (Figure 1). The results obtained

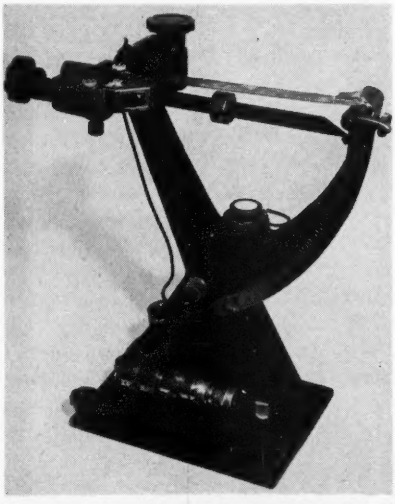

Figure 1.

are expressed in terms of the wire size, torque applied, and the resulting degrees of bend.

★ ★ ★

Since these data were difficult to evaluate quantitatively, a better way of expressing the test data was sought—some way that would lump all of the variables, including wire or ribbon cross section, torque applied, and degrees of bend into one term, characteristic only of the stiffness. The following correlations were arrived at in an empirical manner by the use of test records and special tests.

Results

First it was established that for any one piece of wire or ribbon with a uniform temper and cross section, the factor

$$\left(\frac{\text{Torque}}{\sqrt{\text{bend}}}\right)$$

is a constant. The validity of this relationship is illustrated by the test results given in Table I.

TABLE I

Stiffness Test Data for Round and Flattened Wire of Uniform Temper and Cross Section

Torque (gm-cm)	Degrees of Bend	Torque / ∛Bend
One length of 20 gage wire		
450	10.4	206
500	14.0	208
550	19.5	204
600	25.1	206
650	32.8	203
700	39.8	205
750	47.0	208
One length of .300" X .0180" ribbon		
1600	19	600
1800	28	595
2000	36	606

TABLE II

Stiffness Test Data for Wires of Various Diameters with The Same Temper

Wire Dia. (in.)	Approx. B & S Gage	Torque (gm-cm)	Degrees of Bend	Torque / ∛Bend	$\sqrt[3]{\text{Torque}/\sqrt[3]{\text{Bend}}} \div \text{Diameter} = S_w$
.0227	23	200	25	68.5	180
.0202	24	130	19	48.7	181
.0176	25	100	33	31.2	179
.0155	26	70	34	21.6	179
.0143	27	50	24	17.4	181
.0126	28	36	28	11.8	181

TABLE III

Stiffness Test Data for Flattened Wires of Various Cross-Sections with the Same Temper

Cross Section (in.^{2})	Torque (gm-cm)	Degrees of Bend	Torque / ∛Bend	$\sqrt{\text{Torque}/(\text{width} \times \sqrt[3]{\text{bend}})} \div \text{Thickness} = S_r$
.315 X .0395	11,100	31	3540	2660
.334 X .0305	7,000	33	2180	2650
.186 X .0207	1,600	25	548	2620

Next it was established from tests on round wires annealed to the same temper that the factor

$$\frac{\sqrt[3]{\text{Torque}/\sqrt[3]{\text{bend}}}}{\text{diameter}}$$

was independent of size, at least in the range tested, as shown in Table II. This factor then describes adequately the true stiffness of the metal in the wire, irrespective of applied torque, degrees of bend, or size. The factor was called "S_w", or wire-stiffness factor.

★ ★ ★

For flattened wire it was found that if various sizes were annealed to the same temper, the factor

$$\frac{\sqrt{\text{Torque}/(\text{width} \times \sqrt[3]{\text{bend}})}}{\text{thickness}}$$

was independent of the cross-sectional dimensions, as shown in Table III. This term was called "S_r" or ribbon-stiffness factor.

Discussion

Thus by a simple calculation based on bend test values, a method is available for evaluating the stiffness of the metal in wires or ribbons which is independent of their size.

★ ★ ★

It would, of course, be an added advantage if the two values, S_w and S_r, would be correlated with some value which is commonly used to characterize the temper of a metal. An approach to a correlation with the Rockwell-B hardness number has been made, but discrepancies seem to exist, particularly for round wires. Two difficulties hampering this correlation have been the problem of making reliable hardness measurements on a curved surface, and the problem of a double conversion to a desired hardness value.

★ ★ ★

An example of how the S_w and S_r values may be used is illustrated by the test data in Table IV for three different chrome-nickel alloys. One length of annealed wire of each alloy in the size range of .0395-.0399 inches diameter was drawn successive passes through round dies until the final diameter of .0285 inches was reached. The S_w values show the relative stiffness of each alloy in each condition, and the rate of work-hardening caused by cold-drawing.

★ ★ ★

However, by far the greatest use for the stiffness values are in quality control and specifications for finished wire. It affords a means for supplier and consumer to express themselves on common ground.

★ ★ ★

Instead of quoting, for instance, that "the .0399 inch specimen shown in Table IV has a stiffness such that 1200 gm-cm of torque are required to bend it 35° in the RCA 719-H Tester", we simply report that "the specimen has a stiffness factor of $S_w = 179$". This same unit may be used for any size of specimen which comes within the range of the testing instrument.

Summary

Experimental data have been presented which show that test data obtained in wire stiffness tests by ASTM Method B-113-41 can be converted to values which are independent of the wire size

(*Please turn to page* 924)

Continuous Gaging for Machine Control

by Albert C. Sanford
Engineering Department
Federal Products Corporation
Providence, Rhode Island

In this article the author discusses various methods of gaging wire and plastic coated conductors continuously to determine off size and lack of uniformity in outside diameters. A method adopted by a number of companies, not only to measure, but to record diameter variations is described.

Wire drawing or coating done on a continuous basis presents problems which are not encountered in cyclic operations such as occur on automatic screw machine.

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Most continuously formed material gives the superficial impression of being smooth. It is, in fact, full of local high spots and depressions. On coated wire, for example, the covering tends to conform to the contour of the core. This is especially true with a stranded conductor. A cross section taken through any portion of the wire will show that variations in the contour of the core are reflected in the contour of the covering.

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Bare wire, usually formed as a single solid strand, will show the same characteristics but a lesser degree. These variations can be caused by many factors, among which are variations in drawing tension, material characteristics, etc.

★ ★ ★

One generally used method of determining the manufacturing size of such continuously formed material is to hold a micrometer in the pass line, adjusting the thimble until the wire produces an estimated amount of drag on the micrometer. The micrometer is then removed and the reading noted.

★ ★ ★

Contrary to a very widely held opinion it is not possible to hold a micrometer in contact with such moving material and obtain an accurate measurement of size. In addition, the readings obtained by two operators on different shifts will not necessarily agree.

The reason for this is not difficult to understand. In many cases the purely local bumps or depressions exceed the allowable variation for average material size. When the measurement is obtained with a micrometer or similar fixed anvil type gage, the high spots are the only parts which are touched and measured.

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It is possible for wire with many short duration high spots to give exactly the same micrometer feel as a somewhat smaller average size wire with longer duration high spots.

★ ★ ★

Occasionally, a more sensitive instrument is used in an attempt to show more of the variations in the size of the material. Such an instrument might consist of a pair of rollers and a Dial Indicator. This type of gage will give a high reading for a bump and a low reading for a small spot. Where the indicating device has mechanical amplification, including levers and gears, the hand is in a constant state of movement or vibration. This reflects its attempt to follow the frequently occurring local variations.

★ ★ ★

In most manufacturing processes it is not possible to eliminate such local variations and they are not seriously detrimental to the final product.

★ ★ ★

The problem then is to overlook this local variation and read only the average thickness. This can be done electrically. Such a damped indicating device overlooks the extreme highs and lows and gives an indication of the average stock size.

★ ★ ★

A damped indicating device generally is considered as a trend-indicator. Its prime purpose is to warn the operator, or when connected through suitable power units to control the machine. Automatic control helps the machine produce material of the same size all day long.

★ ★ ★

Figure 1 shows the installation of a contact type trend measuring device on a wire drawing operation. This type of gage is used to provide a visual indication of when the material goes offsize. It can also be used with a recorder to provide a written record showing size variations throughout the life of the die.

★ ★ ★

In the process of coating wire with plastic or rubber, the general aim is to meet the minimum standard. In order to meet this standard, the coating thickness usually has to be run somewhat above the minimum. Since the coating material is purchased by the pound and sold by the foot of wire, this results in the giving away of many pounds of expensive material every day.

★ ★ ★

Those who have had experience with wire coating know that the covering after extrusion or vulcanizing is not absolutely smooth and round. These variations, when combined with possible compress-

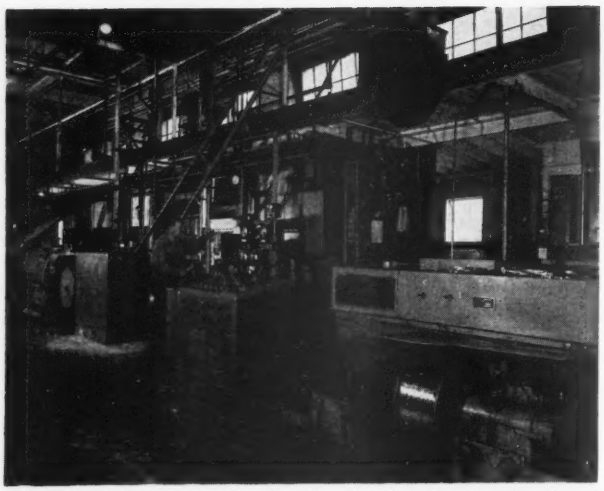

Figure 1.

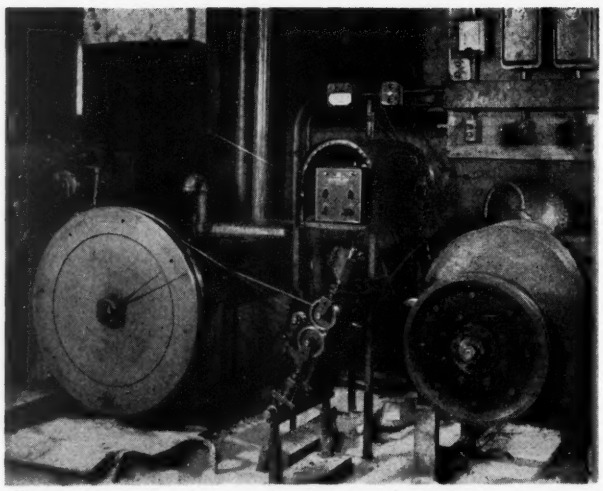

Figure 2.

ibility of the coating and inaccuracies of hand-miking make it almost impossible to eliminate these loses with usual methods.

★ ★ ★

Generally the number of pounds of plastic coating per thousand feet of wire can be predicted. A simple calculation of the number of pounds of plastic passed through an extruder in a given period of time and compared with the actual number of feet of wire run should give an indication of the process efficiency.

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In general an extruder operator will use hand-mikes to measure coated wire and do this every 15 minutes or so. When consideration is given to the inaccuracies of this method of measurement and production figures are compared to the number of pounds of plastic used, it is no wonder that shrinkage appears. There is also, of course, the other possibility that a number of feet of wire with a thin coating may have been run to make up for an overage on other sections.

★ ★ ★

With the hand-miking or other approximate methods generally used, it is easily possible to have an average excess thickness of more than .001" on plastic coated wire. In addition the average extruder process is not constant. There are continual changes occurring in the actual size of the wire. If the operator, for example, checks wire size once every 15 to 30 minutes, we have no way of knowing what occurs in the interval between measurements. This can be an important factor. For example with the #18 solid wire being coated at the rate of about 30,000 feet per hour each extra .001" insulation thickness uses almost two extra pounds of plastic per hour. If the over thickness is greater than .001", and it usually is, the extra plastic is proportionately larger. Carrying this calculation out for full shift operations on a weekly or monthly basis shows the extent of the possible loss and helps to account for some of the shrinkage which is normally encountered.

★ ★ ★

In an attempt to provide more consistent measurements some companies have used roller type gages with indicators. These were helpful in many applications since the measurement shown on the dial is not at all dependent on the operator's feel. Operators on the second and third shifts could read the dial and come up with the same approximate reading as was obtained by the first shift man. This is not usually the case with micrometers. This roller and dial indicator type of gage does provide some advantages but it also has disadvantages. As mentioned before, wire tends to be somewhat uneven. The indicating gage with its mechanical amplification shows these irregularities as a rapid vibration of the indicator hand. This vibration covers some distance on the dial and makes it difficult for the operator to determine the size of the wire down to the last few thousandths of an inch.

★ ★ ★

The problem of measuring wire then resolves itself into one of providing a gage which overlooks the local bumps and variations and provides a steady indication of the average wire size. While this portion of the problem was being considered, it was felt that the investigation might as well be carried through to a logical conclusion and have the gage automatically control the plastic extruder.

★ ★ ★

This gage and its two control cabinets are shown in figure #2. The gage consists basically of two rollers, one fixed and one movable. The wire to be measured passes up over a guide roller and between the measuring rollers. Size changes in the wire cause the sensitive roller to move either closer to or further away from the reference roller. These movements are observed by the Electricator. The Electricator consists of a Dial Indicator which is used for approximate indications and setup only and a hi-limit and lo-limit switch built into one case. The separate hi-limit and lo-limit switches are connected to suitable thyratron circuits in the Electricator control panel. Each of these thyratron circuits is equipped with a time

(*Please turn to page* 925)

Overhead Conveyor System Mechanizes Processing in Wire Plant

by L. F. Ashford, President
Specialty Engineering Company
Philadelphia, Pa.

This article describes a new overhead material conveying system that has greatly added to efficiency of production in Alloy Metal Wire's wire mill. It was designed especially for their requirements.

A new push-button conveyor system that carries wire automatically through a series of manufacturing steps, including pickling, annealing and descaling, was recently put into operation at Alloy Metal Wire Company, Prospect Park, Pa.

★ ★ ★

And the verdict?

★ ★ ★

It's an unqualified success—production-wise, efficiency-wise and economy-wise. Take it straight from E. M. Schmid, of Alloy Metal: "Within the past year our production facilities have been increased by 100 per cent and we attribute much of this to the excellent results achieved by our new overhead conveyor."

★ ★ ★

The conveyor system, developed by Specialty Engineering Company of Philadelphia, consists of an overhead chain conveyor and high speed electric hoists. After the wire is loaded on carriers, the conveyor carries the wire around a loop system, traveling in a 360 degree arc. As it makes the circuit, the wire carriers pass through the pickling, water spray, baking, annealing and descaling tanks and then to final delivery takeoff. Approximately 1,000 pounds are delivered each hour.

★ ★ ★

As many as eleven separate and distinct operations in the production of annealed wire have thus been changed from manual to automatic operation, compressing a work cycle that previously consumed weeks into a matter of hours.

Of the eleven operations, only the first and last—loading and unloading—require the active attention of the operator. In between, the automatic functions take over entirely.

★ ★ ★

There's a separate station for each operation; each one, naturally, following the other in the order of its progression in the manufacturing process.

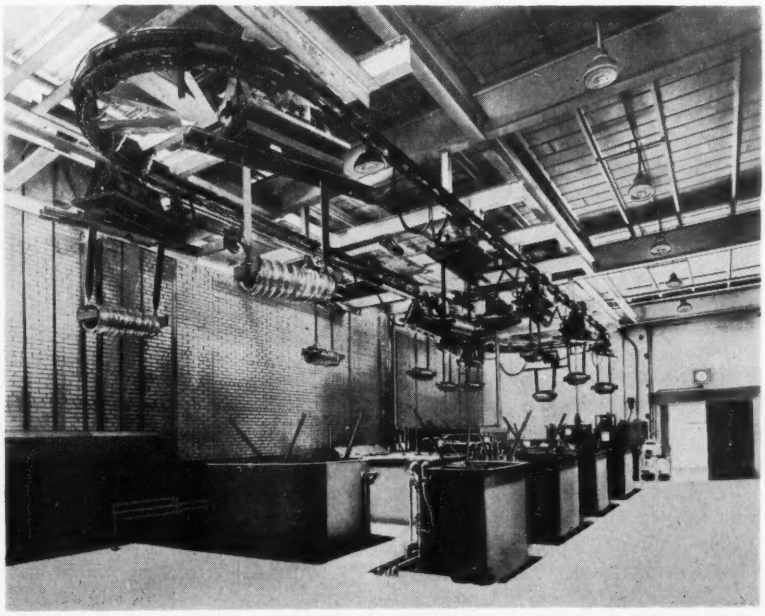
★ ★ ★

In operation, the eleven carriers on the conveyor are each loaded with 500 pounds of wire. The conveyor rises, advances and dips again, carrying the wire from one station to the next. The movement is controlled by an automatic timer, which repeats the operation automatically until each load of wire has been carried through each station.

★ ★ ★

The time cycle is governed by the annealing time required for the particular alloy being processed, since the other operations are flexible enough to adjust to it. Operations performed at the various stations are:

1. **Loading 500 pounds of wire on the conveyor fixture.**
2. **3, and 4 stations are all the same and consist of 14 per cent concentration nitric acid deleading baths operating at 160 degrees F. Approximately 1½ hours are required for removing the lead which is used as a drawing lubricant on Stainless Steels.**



Overhead conveyor installation at Alloy Metal Wire Co. * * * * * *

5. **Water washing to remove the nitric acid along with any soluble lead compounds.**
6. **Flash-type baker, as wire must be completely dry going into salt bath annealing furnace.**
7. **Ajax salt bath annealing furnace operating 2,000 degrees F. with mixture 85 per cent barium chloride, 15 per cent sodium chloride.**
8. **Salt water bath quench tank.**
9. **Virgo caustic descaling bath operating at 925 degrees F.**
10. **Virgo water quench bath.**
11. **Unloading.**

★ ★ ★

Alloy Metal reports an increase of 250,000 pounds of wire per month in annealing and pickling capacity, and attributes 75 per cent of this to the new conveyor. It reports the new system keeps more work in process, because the operation is smoother, the flow uninterrupted and bottlenecks are no longer a complicating factor. Production turnover is speeded. Spoilage, because of the greater overall production efficiency, is practically eliminated.

★ ★ ★

While wire makers will be impressed primarily by the production increase, the new conveyor system is responsible for several other significant contributions to plant efficiency. These are:

1. **Economy of space**
2. **Economy of operational time**
3. **Economy of manpower**
4. **Economy of work**

★ ★ ★

Let's take them one at a time:

★ ★ ★

The space-saving factor is readily apparent. The conveying system suspended as it is above the tops of processing tanks and baker, uses space vertically rather than horizontally; that is, it takes up normally unused floor-to-ceiling space for operations that generally require valuable floor space in the plant. Moreover, the series of operations is concentrated in one tight space, whereas formerly, it was spread over a wide factory area.

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The impressive truth is that while a load of wire traveled as far as one-half mile to complete its processing under the old operation, it now moves an overall length of 110 feet.

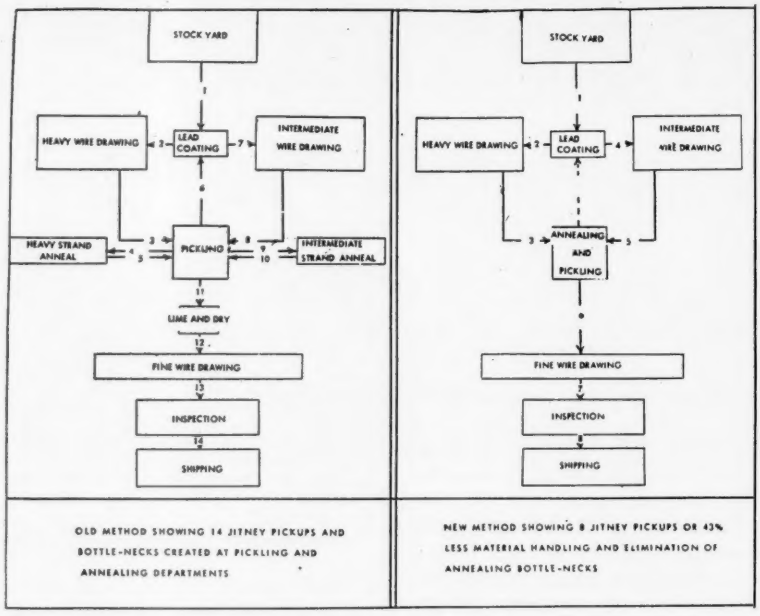

Chart 1. Flow sheet of old and new annealing, pickling and drawing. * * *

The practical results at Alloy Metal are that wear on floors is reduced and the net-per-square-foot earning power of floor space is materially increased. Factory space is, in a very real sense, doing double production duty.

★ ★ ★

The saving in time is phenomenal. From the moment the load is started until it is delivered at completion of the loop, approximately three hours are consumed for operations that previously spread over weeks.

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Economies in work and manpower are, naturally, cause and effect, and may be discussed together. The new layout has eliminated lost motion and extra handling. Under the old system, a minimum of 14 jitney pickup operations were required to carry material to various work stations. This has now been cut to eight, representing a reduction of 43 per cent in time and costs in material handling.

★ ★ ★

And the startling fact is that the new conveyor system, because of its complete mechanization, permits one man to do the work of three while assuring vastly stepped up production of highest quality product. The product is untouched by hand between loading and unloading. Absence of the human element during the complete circuit means elimination of lags and interruptions, and results in more efficient production. Loading and unloading wire from the conveyor carriers is done by a fork lift truck.

★ ★ ★

In sum, the labor saved in the various processing operations can be diverted to even further increased production. Elimination of such manual operations as handling heavy coils of wire during processing is also an important achievement.

★ ★ ★

Alloy Metal Wire Company is a major producer of wire for all purposes. It was organized in 1919 and has enjoyed a marked growth ever since. The company prides itself on the quality of its product and the modern methods and equipment used in its manufacture.

★ ★ ★

Mechanization is one of the principal objectives in Alloy Metal's modernization program. Achieving it within the sphere outlined above represented a challenging problem to Specialty Engineering Company.

(*Please turn to page* 927)

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453 MAIN STREET **STAMFORD, CONN.**

THE ANNUAL CONVENTION OF THE WIRE ASSOCIATION

LA SALLE HOTEL, CHICAGO, ILL., NOVEMBER 9-12, 1953

The Wire Association's Headquarters at The LaSalle Hotel
will be open from Monday, November 9th, every evening during the Convention.
Come and get acquainted!

THERE WILL BE A REGISTRATION FEE OF $6.00 FOR THOSE ATTENDING THE TECHNICAL SESSIONS AND MEETINGS.

PLEASE HAVE YOUR ASSOCIATION MEMBERSHIP CARD WITH YOU AND SHOW IT WHEN REGISTERING.

ADMISSION WILL BE BY BADGE ONLY—PLEASE WEAR IT.

THE WIRE ASSOCIATION PROGRAM COMMITTEE FOR THE 1953 CONVENTION

GENERAL CHAIRMAN
Tom M. Girdler, Jr.
Assistant Manager of Operations
Union Drawn Steel Division
Republic Steel Corporation
Massillon, Ohio

FERROUS DIVISION

CHAIRMAN

John L. Sanderson
Superintendent, Wire Mills
Keystone Steel and Wire Co.
Peoria, Illinois

COMMITTEE MEMBERS

Bruce W. Siemon
Standard Industrial Compounds Co.
Chicago, Ill.

Edgar T. Miller
Supervisor Wire Die Sales
Firth-Sterling, Inc.
Pittsburgh, Penna.

Ray S. Worth, Mfr. Mgr.
Wire Mills Division
John A. Roebling's Sons Corp.
Trenton, N. J.

C. H. Williams, Jr.
Superintendent, Wire Mills
Pittsburgh Steel Company
Monessen, Penna.

Technical papers are preprinted in the October issue of Wire and Wire Products insofar as possible. Titles to papers accepted will be given to The Wire Association and duly copyrighted at the time of publication.

GENERAL ACTIVITIES

EXECUTIVE SECRETARY
Richard E. Brown
The Wire Association
Stamford, Conn.

REGISTRATION
R. S. Spengel, Asst. Exec. Secy.
The Wire Association
Stamford, Conn.

ENTERTAINMENT
Eber J. Hubbard, President
Hubbard Spool Company
Garrett, Ind.

All papers presented at the Convention by members of The Wire Association are eligible for consideration for the Annual Medal Award, and will be voted upon by the Board of Directors at the next Spring meeting of that body.

NON-FERROUS DIVISION

CHAIRMAN

William L. Wells
Sales Engineer
Reilly-Whiteman-Walton Co.
Conshohocken, Penna.

COMMITTEE MEMBERS

James E. Flood, Chief Chemist
Plastic Wire and Cable Corp.
Jewett City, Conn.

Sidney Rolle, Asst. Manager
The Scomet Company
New York, N. Y.

Leslie C. Whitney, Chief Met.
Copperweld Steel Corp.
Glassport, Penna.

Grayson B. Wood, Jr., Metallurgist
Scovill Manufacturing Co.
Waterbury, Conn.

All wire mill men and wire mill suppliers are invited to attend this convention, see how the Association functions and participate in the activities.

Hotel reservations should be made by members of the Wire Association direct to the Secretary.
MAKE YOUR PLANS NOW TO ATTEND AND SEND YOUR RESERVATION PROMPTLY

MONDAY, NOVEMBER 9th

9:00 A. M.
REGISTRATION

10:30 A. M.
DIRECTORS' MEETING

12:30 P. M.
PROGRAM COMMITTEE LUNCHEON

THE CONVENTION PROGRAM

LA SALLE HOTEL, CHICAGO, ILL., NOVEMBER 9-12, 1953

MONDAY, NOVEMBER 9th

9:00 A.M. Registration Desk opens on the mezzanine floor.

10:30 A.M. Annual Meeting of the Board of Directors of the Wire Association.

12:30 P.M. Directors' Luncheon for Program Participants.

AFTERNOON SESSION—2:00 P.M.

Joint Technical Meeting for Both Ferrous and Non-Ferrous Groups.

CHAIRMAN OF MEETING

Bruce W. Siemon, Standard Industrial Compounds Co., Chicago, Ill.

Address of Welcome by Leonard C. Crewe, Jr., Pres., Maryland Fine & Specialty Wire Co., Cockeysville, Md., President of The Wire Association.

PAPER: "Quality: the Key to Economical Use of Diamond Abrasives."	Only the customer controls the quality of the abrasives he buys. How to do this and its importance from standpoint of quality.	by Charles R. Myer, Manager Abrasives Division Elgin National Watch Co. Elgin, Ill.
PAPER: "A Nickel-Free Austenitic Steel for High Strength Wire."	A new non-magnetic manganese steel to replace stainless steel in spiral-four cable and elsewhere developed by the Institute.	by H. O. McIntire, Res. Eng. and G. K. Manning, Res. Eng. Battelle Memorial Institute Columbus, Ohio
PAPER: "Components of Wire Drawing Lubricants."	Properties of fats, fatty acids, soaps and additives. How understanding of these aids in producing lubricants with characteristics suited to drawing conditions.	by Leon Salz, Mgr., Lubricants Div. Magnus Chemical Company Garwood, N. J.

TUESDAY, NOVEMBER 10th

FERROUS SECTION

MORNING SESSIONS—9:30 A.M.

CHAIRMAN OF MEETING

Edgar T. Miller, Mgr. Wire Die Sales, Firth-Sterling, Inc.
Pittsburgh, Pa.

SYMPOSIUM: The Progress of Mechanical Descaling of Rods for Wire Drawing.

In these presentations various problems and factors connected with the process will be discussed. Each panel member will discuss a phase of the problems.

PANEL MEMBERS

George Fecson, Die Room Foreman
Pittsburgh Steel Co.
Monessen, Pa.

H. J. Godfrey, Asst. Chief Engineer
Development and Research
John A. Roebling's Sons Corp., Trenton, N. J.

C. F. Wickwire, Vice Pres.
Wickwire Brothers, Inc.
Cortland, N. Y.

Arthur Hedman, Die Room Foreman
Wickwire Spencer Steel Div.
Colorado Fuel & Iron Corp.
Palmer, Mass.

Walter A. Smigel, General Mgr.
R. H. Miller Company
Homer, N. Y.

S. L. Stalson, Research Project Eng.
American Steel & Wire Div.
United States Steel Corp.
Cleveland, Ohio

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Grayson B. Wood, Jr., Met. Scovill Manufacturing Co.
Waterbury, Conn.

PAPER: "Manufacture of Rivets and Screws."	Discussion of production techniques in producing ferrous and non-ferrous screws and tubular rivets.	by Victor Caltham Milford Rivet & Machine Co. Milford, Conn.
PAPER: "Processing of Phosphor Bronze Wire."	The common bronze alloys, their properties and manufacture of wire from raw materials.	by Earle W. Lovering, Asst. Wks. Mgr. Seymour Mfg. Co. Seymour, Conn.
PAPER: "Twisted Paper's Role in the Wire Industry."	Uses and properties of paper in electric conductor and wire rope constructions.	by W. Garwood Bacon, Jr., Sales Mgr. E. W. Twitchell, Inc. Philadelphia, Pa.

TUESDAY, NOVEMBER 10th (cont'd)

AFTERNOON SESSION—2:00 P.M.

FERROUS SECTION

CHAIRMAN OF MEETING

Ray S. Worth, Mfg. Mgr., John A. Roebling's Sons Corp., Trenton, N. J.

PAPER: "The Drawing of Shaped Steel Wire."	Methods of processing shaped steel wire with discussion of dies, coatings, lubricants and drawing machines.	by Vito J. Vitelli, Process Eng. Steel Wire Mill Div. John A. Roebling's Sons Corp. Trenton, N. J.
PAPER: "Continuous Annealing with Carbon Restoration of Coils and Bars."	Republic Steel's methods of controlling this phase of steel coil and bar manufacture.	by J. D. Armour, Chf. Met. Union Drawn Steel Div. Republic Steel Corp. Massillon, Ohio
PAPER: "Rod and Wire Quality vs. Cold Heading Quality."	The author does not take issue with the quality of the rods supplied by the producer, but rather with the improper uses to which they may be put in cold heading operations.	by W. E. Hill, Jr., Plant Supt. Russell, Burdsall & Ward Bolt and Nut Co. Rock Falls, Ill.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

James E. Flood, Chief Chem., Plastic Wire & Cable Corp., Jewett City, Conn.

PAPER: "Rural Distribution Wire."	Characteristics, construction and installation of a new self-supporting six-pair wire developed as a rural distribution facility.	by C. C. Lawson, Wire Develop. Eng. Bell Telephone Laboratories Murray Hill, N. J.
PAPER: "Electrical Motors and Control for Slip Type Wire Drawing Machines."	This paper is concerned with such equipment as it applies to non-ferrous wire drawing machines.	by H. A. Dickerson, Application and Project Engineer Control Engineering Department Westinghouse Electric Corporation Buffalo, New York
PAPER: "A Review of Fluorothene in the Wire and Cable Industry."	Properties of fluorothene insulated wire, extrusion techniques in covering wire and the latest testing methods, particularly for high temperature performance.	by F. W. Wurtzell and W. J. Canavan, Dev. Engrs. Bakelite Company New York, N. Y.

WEDNESDAY, NOVEMBER 11th

MORNING SESSIONS—9:30 A.M.

FERROUS SECTION

CHAIRMAN OF MEETING

C. H. Williams, Supt. Wire Mills, Pittsburgh Steel Co., Monesson, Pa.

PAPER: "Handling and Storing of Wire and Wire Products."	Effect of change of rod bundle size on storage space and revisions required to handle and store wire products for efficiency.	by C. C. Tappero, Supt. Wire Mills Colorado Fuel & Iron Corp. Pueblo, Colo.
PAPER: "The Foreman's Function with Regard to Methods of Controlling Quality."	Basic theory of quality control program with applications to oil tempering and patenting departments.	by M. G. Boyd, Asst. West Mill Supt. Steel Company of Canada, Ltd. Hamilton, Ont., Can.
PAPER: "Production and Quality Control, Plus Mill Information—Sales Department Musts."	Relationship of production and sales departments necessary to keep both functioning at full efficiency for customers.	by Eugene K. Wright, Sales Mgr. Manufacturers' Division Continental Steel Corp. Kokomo, Ind.

NON-FERROUS SECTION

CHAIRMAN OF MEETING

Leslie C. Whitney, Chf. Met., Copperweld Steel Co., Glassport, Pa.

PAPER: "Results of Research on Insulated Wire."	Discussion of microbiological deterioration of and improvements made in last decade in rubber insulation.	by Dr. John T. Blake, Dir. of Research Simplex Insulated Wire & Cable Co. Cambridge, Mass.
PAPER: "The Properzi Process for Continuous Casting and Rolling of Aluminum Redraw Rod."	Since this process of casting rod was introduced to this country, significant improvements have been effected in it. How the process is used here and in Europe is described.	by Frank R. Nichols, Pres. Nichols Wire & Aluminum Co. Davenport, Iowa
PAPER: "Neoprene Coverings for Weatherproof Wire."	Discussion of properties important in a covering for weatherproof wire and neoprene's use in this respect.	by C. E. McCormack and R. H. Baker Rubber Chemicals Div. E. I. duPont de Nemours & Co. Wilmington, Del.

WEDNESDAY, NOVEMBER 11th (cont'd)

AT 1:00 P.M. — THE ANNUAL WIRE ASSOCIATION LUNCHEON

GUEST SPEAKER: L. B. Worthington, Pres. U. S. Steel Supply Division
U. S. Steel Corporation, Chicago, Ill.

LADIES WELCOME

The Mordica Memorial Lecture: "Reminiscings of an Old-Timer."
by Charles D. Johnson, Former President, Johnson Steel & Wire Co., Worcester, Mass.

LADIES WELCOME

THE PRESENTATION OF AWARDS FOR 1952

MEDAL AWARD: Howard J. Godfrey, Asst. Chief Eng., Development Engineering, John A. Roebling's Sons Corp., Trenton, N. J. for the most meritorious paper—"Significance of the Elongation Test on Wire."

CERTIFICATE OF HONORABLE MENTION for Ferrous Papers: Jere Y. Heisler, Asst. Genl. Foreman, Wire Drawing, Rod and Wire Mills, Bethlehem Steel Co., Sparrows Point, Md., for paper—"Improved Lime Bath for Performance by Recirculation."

CERTIFICATE OF HONORABLE MENTION for Non-Ferrous Papers: Edward P. Hall, Met., Kennicott Wire & Cable Co., Phillipsdale, R. I., and Robert D. Peck, Dist. Eng., Industrial Products Div., Johns-Manville Sales Corp., Boston, Mass. co-authors for paper —"Development of New Asbestos Insulated Magnet Wires."

AT 4:00 P.M.—THE ANNUAL MEETING OF THE WIRE ASSOCIATION
This is the annual business meeting of members of the Association. Your personal attendance is needed and urged.

Chairman of Meeting
Leonard C. Crewe, Jr., President,
The Wire Association

IN THE EVENING

THE ANNUAL STAG SMOKER—DINNER

6:30 P.M.—Cocktail Bar Opens

7:30 P:M.—Dinner and Show

CHAIRMAN, ENTERTAINMENT COMMITTEE: Eber J. Hubbard, Jr.

COME ONE, COME ALL—AND HAVE A GOOD TIME!

THURSDAY, NOVEMBER 12th

The day is devoted entirely to plant inspection tours, of which there are two, as follows:

FOR THE FERROUS GROUP: To Republic Steel Corporation's Rod and Wire Mills in Chicago. Busses leave the LaSalle Hotel early Thursday A.M.

FOR THE NON-FERROUS GROUP: To Western Electric Company's Hawthorne Works. As no more than 125 men can be handled on one trip, TWO TOURS ARE PLANNED. The first must leave the hotel in busses at 8:30 A.M. and be out of the plant by 11:00 A.M. The second will leave the hotel at 1:30 P.M. and leave the plant by 4:00 P.M. Go on the first trip, if possible.

PERSONS WHO ARE NOT U. S. CITIZENS MUST BE CLEARED IN ADVANCE FOR ALL TOURS. PLEASE ADVISE MR. BROWN BY NOVEMBER 1st OF YOUR DESIRE TO TAKE THIS TRIP.

FOR BOTH TOURS, FERROUS AND NON-FERROUS, ALL PERSONS MUST GO BY BUS. NO PRIVATE CARS MAY BE USED. TO BE ADMITTED, ALL VISITORS MUST WEAR THEIR BADGES; NO EXCEPTIONS, PLEASE: THESE MEASURES ARE FOR SECURITY REASONS.

These plant inspection trips conclude the 1953 Convention.

RESEARCH PAPERS ARE PREPRINTED IN THE OCTOBER ISSUE OF WIRE AND WIRE PRODUCTS.

The Discussions and the Mordica Memorial Lecture will be printed in the January issue of Wire and Wire Products.

Papers not received in time for preprinting will be published in the November and December issues of Wire and Wire Products.

Standardized Carbide Fastener Nib Dimensions Meet Most Cold Heading Needs

by A. Earle Glen
Manager of Die Sales
Carboloy Department of General Electric Company
Detroit, Michigan

In this article Mr. Glen gives some practical pointers on the use of cold heading dies and the relation of the use of die nibs of standardized dimensions to more economical production.

Standardization of carbide nib dimensions for bolt, screw and rivet heading operations is now making it possible to produce 93 per cent of all production requirements from standard off-the-shelf nibs. Stemming both from a better grade of carbide for nibs and the combining of important nib proportion factors into definite design principles, it today enables most major screw, bolt and rivet producers to decrease machine down-time for die changes to step up production, maintain better tolerances and lower die costs per piece.

★ ★ ★

Initially, for heading work, the problem was to obtain a grade with the desired physical characteristics to overcome the major difficulty of shrinkage and warpage found in earlier grades. Also it was necessary to produce a material that could be easily drilled and machined to overcome the costly lapping operation.

★ ★ ★

An improved carbide grade is the answer. Today nibs of the 190 grade can be held to close and consistent tolerances and can be readily drilled and turned.

★ ★ ★

In bolt heading with early carbides, there was much hit-and-miss experimenting with casing methods. Through experience, it was learned that there are definite proportion requirements of nibs and casing for any nominal bolt, rivet or screw size to give best results.

★ ★ ★

Important proportions (Fig. 1) in carbide header die assemblies are: The relation of the inside diameter to the outside diameter of the nib; and the nib outside diameter to the casing outside diameter.

A. Earle Glen ★ ★ ★ ★ ★ ★

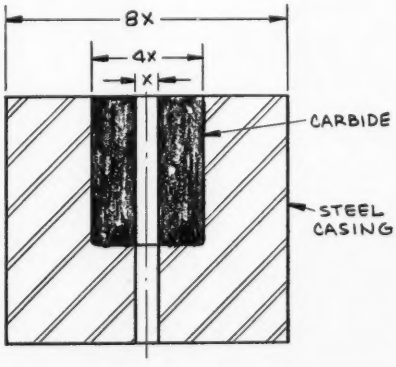

FIGURE 1.

The inside diameter of the nib is determined by the pitch diameter of the part (outside diameter of the part in case of rivets) plus a small amount of stock for finishing.

★ ★ ★

Here are two factors controlling the nib outside diameter:

(1) **The OD must be *larger* than the maximum head size to be formed. (Otherwise the less wear-resistant steel casing would wear.)**

(2) **The OD must be small enough to allow for an ample casing wall to support the nib. (OD of casing should be twice the nib OD or better.)**

None of these presents any particular difficulties, but the combination of the factors led to some definite design principles. First of these is that our standard nibs for any particular size of bolt, rivet, or screw are now given the maximum OD permissible considering item (1) above. This actually provides a nib diameter that runs around four times the bolt diameter (ID of nib). Since head diameters practically never run more than 2.3 times the screw size (usually much less), there is obviously ample carbide for the job.

★ ★ ★

It might be said that this leads to the use of more carbide per nib than is actually required. While this may be true, the savings through standardization more than offset the possible savings by "skimping" on carbide metal. In addition, extra carbide metal on the nib outside diameter facilitates recutting dies to larger sizes.

★ ★ ★

Nib lengths now are standard-

ized to handle the majority of bolt lengths for each size. To do this, an extra ⅛-inch of nib length was allowed. This makes it possible for the work to be confined within the carbide, and have the knock-out pin always inside the nib. Here, again, there is somewhat more carbide metal in the standard nibs than actually needed for the shorter bolt or screw lengths. But again, the added carbide costs are practically negligible, and amount to less than the fabrication of special nibs and their assembly into special casings. The added length also provides more stock for regrinding the die face.

★ ★ ★

In connection with nib length, the best practice is to confine the entire shank of the part in the carbide portion of the die. For exceptionally long bolts, standard nibs can be used effectively by combining hardening of the back part of the steel die casing. This gives a better bearing for the knock-out pin and provides more balanced die wear. **(Fig. 2)**

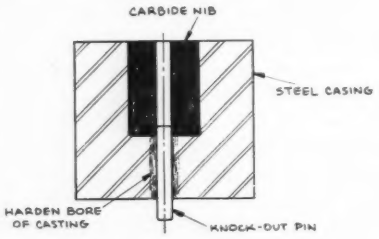

FIGURE 2.

The inside diameter of cored nibs also is standardized so that they are far more adaptable in producing standard size bolts, screws and rivets, etc.—with minimum finishing. These nibs are all of the improved grade 190 which enables any of the standardized nibs to be easily altered by drilling to meet your hole size requirements.

★ ★ ★

As a result of the entire standardization program, these **standard** die nibs (new sizes) now can be used for jobs formerly requiring special nibs at higher cost. For rivet production the standard nib sizes are completely adaptable by merely removing a few extra thousandths in finishing.

★ ★ ★

In designing carbide dies, several factors should be considered. While the carbide grade used for heading work is considered tough and soft as compared to other carbides used for cutting tools and wear resistant applications, its hardness and modulus of elasticity are much greater than steel. This means that the carbide does not deform or "give" to the same extent as steel dies.

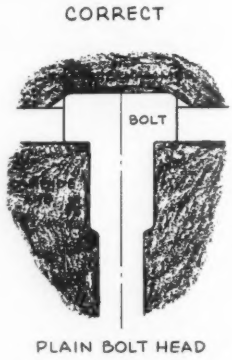

FIGURE 3-A

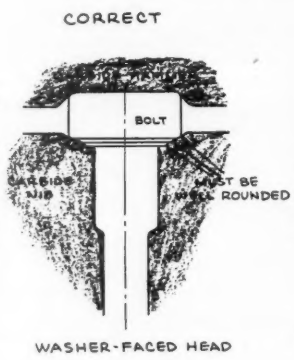

FIGURE 3-B

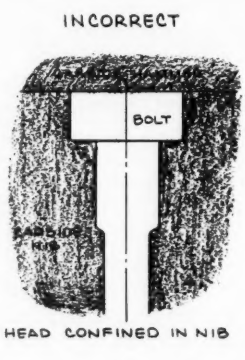

FIGURE 3-C

In practice, this means that space for the work material to flow into is essential, and is the major reason why a steel bolt head should not be completely confined in a carbide die (Fig. 3C). Excess stock on the head of a bolt may permanently damage the die. It is satisfactory to recess the die for washer faces (Fig. 3B), but not for the major portion of the head. Fig. 3A shows the most common successful practice.

★ ★ ★

Best practice is to leave a slight clearance around the edge of the bolt head cavity so that any excess metal can "flow" out in the form of a small flash. Usually the flash is so small that it is immaterial even if not removed. In the case of washer-face bolts, this is no problem.

★ ★ ★

Another item for best performance is to eliminate sharp corners in the die or hammer, Fig. 4. Such corners develop high stress concentrations and sometimes result in the breaking off of sections of the carbide. It is much better to leave a fillet in all corners.

★ ★ ★

An important point to remember in setting up carbide heading dies and hammers is to make sure that the hammer does not "kiss" the die (Fig. 5). While carbide heading dies when correctly assembled and proportioned are highly shock resistant, their resistance to elastic deformation is so great that contact with the hammer builds up extreme stresses. A portion of the nib may chip off or the machine may be damaged if there is undue interference.

★ ★ ★

While there is hardly an application in the heading of metal

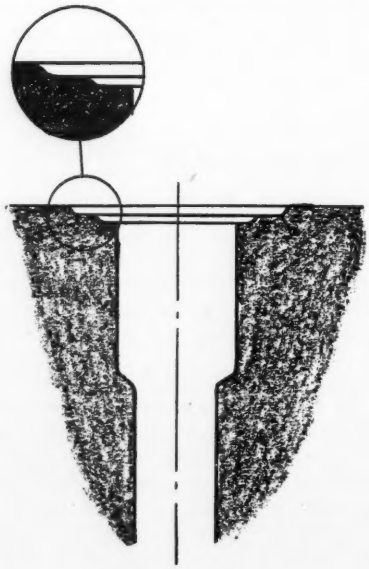

FIGURE 4.

(*Please turn to page* 928)

Electric Furnaces for the Wire Industry

by Ernst von Kannen, Chief Engineer
Russ Electric Furnace Company
New York, N. Y.

This article describes a continuous electric furnace for steel wires in which the operating factors are set forth.

In the wire making industries, precise temperature uniformity is demanded in holding required hardening temperatures, particularly in the hardening operations for steel wire. To meet this definite requirement, wire hardening furnaces are constructed with electrical heating units which guarantee an exact temperature control through automatic regulating instruments.

★ ★ ★

Steel wires, drawn through the continuous wire annealing furnaces, pass through individual heat-resisting tubes. Protective gases contained in the tubes effectively prevent "scaling" so that after the heat treatment, the wires remain bright. In comparison with fuel-heated furnace operations, the wear on the heat-resisting tubes as used in electric furnaces is extremely low, thus annealing costs are diminished.

★ ★ ★

Figure No. 1 pictures an electric furnace with 36 tubes. The heating units are arranged above and below the tubes in separate and individually controlled groups, permitting of precise adjustment of the desired annealing temperature.

The furnace roof, removable sectionally, permits of easy access to the heating elements. With a connection value of 40 KW, the furnace has an hourly output of 200 pounds, at a working temperature of 1750 degrees, Fahrenheit, for steel wire of diameters of from .0079" to .024" (.2 to .6 mm).

★ ★ ★

Connected to these furnaces as described is an electrically heated zinc bath, pictured in Figure No. 2. Electrical heating of the zinc bath has the superior advantage of uniform temperature distribution, in contrast to the lesser uniformity of temperature distribution common to fuel-heated furnaces. The forming of "hard zinc" which so frequently occurs in fuel-heated furnaces is avoided. In the furnace shown in Figure No. 2, no hardened zinc could be detected even after years of operation.

★ ★ ★

In practice, it is recognized that an exact temperature of the zinc bath is of the greatest importance. Excess temperatures favor the formation of "hard zinc" which in turn shortens the life of the zinc troughs. This adversely influences the zinc coating. Sub-normal temperatures, besides causing a higher consumption of zinc, result in defective zinc coatings. All these adverse factors are avoided through the use of electrically heated zinc bath furnaces.

★ ★ ★

The temperature of the zinc bath as well as the heating chamber is regulated in uniform manner by a temperature device connected through two series-wired thermo-electric temperature controllers. The furnace shown illustrated operates with a bath temperature of 865 degrees Fahrenheit, at a temperature variation of not in excess of 4 degrees Fahrenheit, plus or minus.

★ ★ ★

Lead bath furnaces besides salt bath furnaces, for the annealing and tempering of steel wire, present the same advantages through their immersed heating units and long-life troughs. Fuel-heated furnaces have an ever threatening dis-

(*Please turn to page* 928)

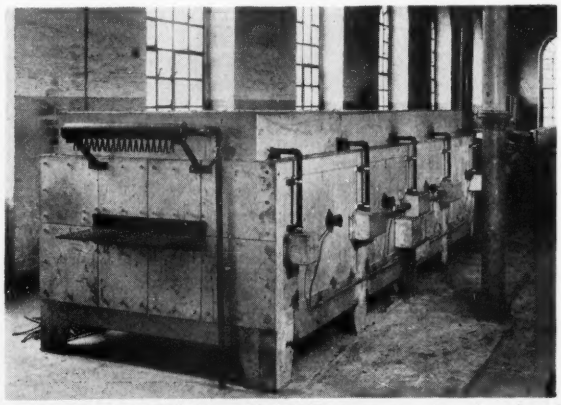

Fig. 1. (above) 36 Tube Russ Electric Furnace. * * * * *

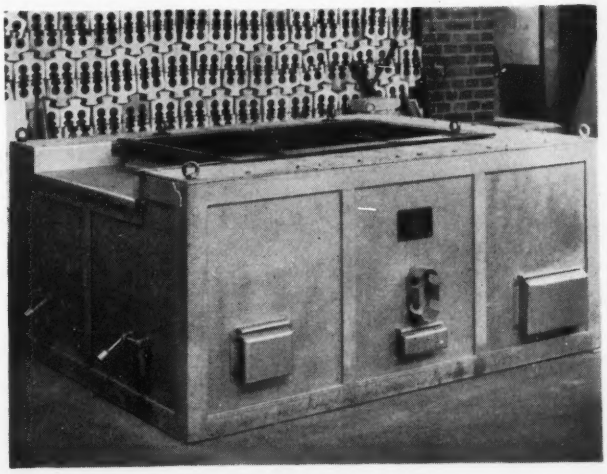

Fig. 2. (right) Electrically Heated Zinc Bath. * * * * *

Copper, Copper Alloy Wire and Electric Conductor Men . . . Note the Coming

NON-FERROUS DIVISION'S WATERBURY REGIONAL MEETING

It's Your Meeting—Come to it on FRIDAY, SEPTEMBER 18, 1953, at the Elton Hotel, Waterbury, Conn.

THE PROGRAM

8:30 A.M.—Registration desk opens. One fee of $7.00 covers meeting, busses, cocktails and dinner.

10:30 A.M.—Technical Session:

PAPER—"Continuous Casting of Brass" by Daniel S. Ogden, Sales Manager, Continuous Metalcast Co., Inc., New York, N. Y.

PAPER—"Plastic and Rubber Covered Cable" by R. A. Schatzel, Vice Pres. and Director of Engineering, Rome Cable Corp., Rome, N. Y.

1:30 P.M.—Plant inspection to the Rod and Wire Mills of Scovill Manufacturing Company. Those who were disappointed last year at not being able to visit these up-to-date mills will be given the opportunity in September. Use the special busses—no private cars.

5-6 P.M.—Cocktail Hour.

6:00 P.M.—Dinner. After dinner the gathering will be addressed by John S. Coe, Manager of Products, Chase Brass & Copper Company, Waterbury, Conn. The title of his talk will be "Marketing Conditions." Mr. Coe's long experience with brass mill products well qualifies him to give a talk worthy of your careful consideration.

It is planned to conclude this meeting by 9:00 P.M. to enable those who have motored to Waterbury for the day to return to their homes in good season.

THE PROGRAM COMMITTEE
CHAIRMAN

William L. Wells
Reilly-Whiteman-Walton Co., Conshohocken, Pa.

MEMBERS

James E. Flood
Plastic Wire & Cable Corp.
Jewett City, Conn.

Kenneth D. Roberts
Waterbury Farrel Foundry and Machine Co.
Waterbury, Conn.

Grayson B. Wood, Jr.
Scovill Manufacturing Co.
Waterbury, Conn.

Benjamin McGar
Chase Brass & Copper Co.
Waterbury, Conn.

William Schmallinger
Chase Brass & Copper Co.
Waterbury, Conn.

Willard deCamp Crater
Naugatuck Chemical Div.
United States Rubber Co.
Naugatuck, Conn.

Edward O. Johnson
Plastic Wire & Cable Corp.
Jewett City, Conn.

MAKE YOUR PLANS NOW TO ATTEND—IT WILL BE A FINE MEETING

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 MAIN STREET **STAMFORD, CONN.**

Molten Salts for the Wire Industry

by Dr. F. R. Morral
Kaiser Aluminum & Chemical Corp.
Spokane, Wash.

and

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New York, N. Y.

Introduction

Molten salts for the commercial heat treatment of metals have shown their usefulness, versatility and ease of control, particularly in times of stress when economic operation is imperative. The limitations to their use depend mainly on the size of furnace available to treat large articles.

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These baths consist mostly of chlorides of Na, K and Ba. So-called rectifying agents, inorganic or organic compounds, are added in small quantities to prevent decarburization which is harmful to medium and high carbon steels. This detrimental effect is considered to be due to an oxidation reaction between the carbon and a bath component at the surface of the steel. The mechanism of decarburization underneath the surface of the steel has been studied and explained recently by W. A. Pennington.[1]

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A so-called neutral salt bath consisting of equal parts of KCl and NaCl (melting point 1215°F) when freshly molten, decarburizes only slightly at temperatures of 1400-1500°F, but the effect increases with the age of the bath.

(1) Trans. Am. Soc. Metals, *37*, 48 (1946) *41*, 213 (1949).

(2) U. S. Military Specifications for Heat Treating Salts, MIL-S-10699 (ORD), Nov. 20, 1950:
Class 5 salt baths: pH of a 1% solution: 6.5 — 8.5
max. carbonates 0.05%
max. alk. earths (as oxides): 0.05%
General Motors Standards: April 1945: max. oxygen compounds: 1.00%

Part I of this article was published in Wire and Wire Products in October, 1945. Parts II and III are printed in this issue. The basic research work on this subject was done by the authors while associated with the American Cyanamid Company's Research Laboratories in Stamford, Conn.

It has been noted that very often decarburization effects increase in proportion to the alkalinity of the bath (carbonate content), specifications, therefore, call for a low alkalinity content.[2] Titration of a salt sample with acid has been considered a rapid, but only qualitative test to indicate the decarburizing power of a production bath. The most accurate decarburization test can be made only by heat treating the material to be processed. Various agents such as oxides, hydroxides and carbonates of Na, K or Ba, compounds of trivalent iron, etc., have been blamed as the decarburizing agents in molten salt baths.[3] An investigation was planned in an attempt to find the causes for the poor correlation between alkalinity and decarburization and to determine the nature of the decarburizing agents. Experimental work consisted of (I) decarburization tests in salt baths of varying composition and age, and (II) the determination of water vapor pressure over molten salt baths.

Part II. NaCl-KCl Salt Baths and Decarburization of Steel in Molten Salt. Equipment and Experimental Procedure

Mixtures of equal parts of NaCl and KCl were melted in open iron pots, 12 inches deep and of approximately 4 inches diameter containing 7-lbs. of molten salt. In some experiments the melts were treated with gases and somewhat smaller (3″ diam., 8″ deep, 4-lbs.) pots were used which were provided with a flanged-on cover which had gas inlets and outlets. The baths were externally heated in electric resistance furnaces and were temperature controlled. Rectangular pieces (2″/2″/0.008″) of degreased high carbon steel (0.95%C) were submerged into the test baths for 30 minutes at a temperature of 1400-1450°F. The samples were then quenched in water and analyzed for carbon. Samples of the melt were taken simultaneously and their alkalinity and iron content were determined. Whenever the effect of gases upon the baths were tested, the gases were bubbled through the bath at a rate of 1.5-3 liters/hr. and the decarburization test on the steel sheet sample was taken immediately after the gas stream had been stopped.

Alkalinity of KCl-NaCl Baths and Effect of Alkalinity on the Decarburization of Carbon Steel (0.95% C.)

Salt samples from a large number of salt baths were tested for alkalinity by titration of the salt solution with 0.1N HCl using Phenolphthalein and Methylred as indicators. Carbonate and Hydroxide contents were then calculated according to standard methods (Table 1.)[4] More exact determinations in CO_2-free water using a glass electrode indicated that, in most cases, the alkalinity consisted mainly of car-

(3) For instance: R. S. Burpo, Materials and Methods, *24*, 109 (1946) J. G. Morrison, Iron Age, May 31, 1951, p. 63.

(4) F. P. Treadwell, Kurzes Lehrbuch der Analytischen Chemie, Bd. II. 1939, p. 486.

bonate only with little or no free hydroxide detectable. Values of up to 1% carbonate (expressed as $KNaCO_3$) were found with samples of experimental KCl-NaCl baths. Freshly melted dry salts, without commercial rectifiers added, usually analyzed between 0.05 and 0.1% carbonate and decarburized 0.95% carbon steel to 0.75-0.80% C in 30 minutes at 1400°F. Salts to which 3 and 5 weight-percent water had been added contained, when molten, up to 0.3% carbonate and some free hydroxide; in one instance 0.02% hydroxide was determined besides 0.12% carbonate.*

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Dry CO_2 gas as well as mixtures of CO_2 and water vapor (30 mm) and N_2 and water vapor (30 mm) were bubbled through various test baths for several hours at a rate of 2 liters/hr. Results of titration of salt samples indicated a slight increase in alkalinity after treatment of the bath with dry or humid CO_2. In addition to the carbonate considerable quantities of bicarbonate could be determined in the water solution of the salt samples. A high solubility of CO_2 in molten KCl-NaCl is, therefore, indicated (at least 0.15% W). From the data in Table 1 it appears, however, that physically dissolved CO_2 can be stripped in subsequent treatments with water vapor (N_2 or CO_2 as carrier gas).

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The increase in alkalinity which is observed to take place in commercial salt baths with time appears to be due to a reaction of the molten chlorides with CO_2 and water. CO_2 may be atmospheric CO_2 or the product of decarburization reaction during heat treating operations.

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Tests were also carried out to determine whether alkali oxides (or BaO) could be present in detectable amounts in salt baths. These compounds are often mentioned in the technical literature as possible decarburizing agents. Na_2O, prepared by reacting metallic sodium with $NaNO_3$ under nitrogen at 600°F, was added to molten KCl-NaCl at 1400°F. Na_2O was converted to NaOH and Na_2CO_3 within a few minutes. The test for Na_2O consisted in oxidizing a salt sample with oxygen in a combustion furnace at about 800°F and titrating with acid permanganate any Na_2O_2 formed. BaO also was found to be transformed into carbonate, 10% of which is soluble in 1:1 NaCl-KCl at 1450°F.

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In figure 1 data from 30-minute decarburization tests in various baths are plotted against the carbonate content of the melt. In all cases the carbonate found had formed by itself; no Na_2CO_3, NaOH or CO_2 had been added to the melt. Baths with less than 0.05% $KNaCO_3$ decarburized only slightly. At higher carbonate values decarburization generally increased with increasing alkalinity, but there was no direct relationship. Baths which contained 1% carbonate decarburized to anywhere between 0.5 and 0.8% C. In a bath consisting of equal parts of KCl and Na_2CO_3 severe decarburization was noted. (Test: 0.2 — 0.3% C.) If a small size bath became acidic in course of time decarburization decreased: A bath containing 0.04% carbonate decarburized to 0.75% in 30 minutes at 1500°F; 50 hours later the carbonate content had decreased to 0.01% and no more decarburization was observed.

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In a series of experiments NaOH, Na_2O and Na_2CO_3 were purposely added to freshly melted KCl-NaCl mixtures. A decarburization test taken immediately after addition of 0.5-1.0% NaOH to a

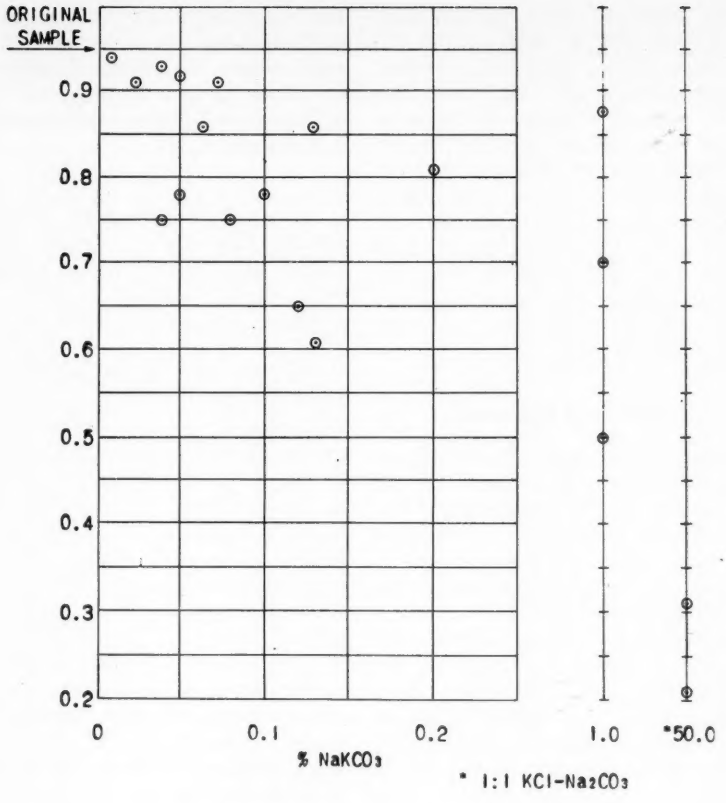
Table I

Effect of CO_2, N_2 and Water Vapor on Molten KCl-NaCl, 1:1 (1400°F.)

Age of Bath (hours)	Treatment with Gases (Duration of each individual treatment in minutes) CO_2	CO_2 – 30 mm H_2O	N_2 – 30 mm H_2O	Salt Sample*) % Na-K-Carbonate	Na-K-Hydroxide	free CO_2
14	-	-	-	0.043	-	-
17	180	-	-	0.043	-	0.022
20	100	-	-	0.061	-	0.013
New bath:						
8	-	-	-	0.036	0.01	-
9	60	-	-	0.073	-	0.018
11	-	-	75	0.061	0.005	-
13	-	90	-	0.097	0.005	-
bath was idled over night, open (1400°F):						
31	190	-	-	0.122	-	0.009
33	-	90	-	0.135	-	-
36	140	-	-	0.122	-	0.018
New bath:						
9	220	-	-	0.037	-	0.022
12	-	70	-	0.055	-	-

*) The samples were taken about 5 minutes after the gas treatment was stopped.

(*) If the quantity of the salt is small compared to the steel surface to be treated (pot and load), the bath may, however, become acidic due to slight corrosion of the steel: salt samples which were taken at the center and at the bottom of a 1000 gr. experimental bath showed considerable difference in acid content (0.002% vs. 0.02% HCl). Salt samples were dissolved in water and titrated electrometrically with 0.1N NaOH. The titration curve indicated the presence of HCl and FeCl2. In larger baths this acidifying effect is apparently overcome by the more pronounced tendency of the bath to become alkaline. Dissolved iron is then precipitated as oxide sludge. X-ray analysis of several sludge samples which were precipitated in a KCl-NaCl bath at 1400-1500°F indicated the presence of Fe_3O_4 only.



DECARBURIZATION IN A 30 MINUTE TEST VS CARBONATE CONTENT OF A KCl-NaCl BATH AT 1400°-1450°F

Figure 1.

neutral bath showed little decarburizing action (C-content: 0.7-0.9% C after 30 minutes at 1400°F). Two hours later, however, severe decarburization was taking place; fresh steel samples analyzed less than 0.5% C after 30 minutes' exposure at 1400°F. Without further addition of NaOH to the bath, decarburization action gradually decreased and after 17 hours decarburization went down to only about 0.7-0.8% C.

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Sodium or potassium carbonate added to the pure chloride caused less decarburization of the steel than NaOH. 0.2% Na_2CO_3 caused little decarburization; the steel samples retained from 0.8 to 0.9% C. One hour after addition of 1% carbonate to a fresh melt the steel samples decarburized to 0.5 to 0.7% C, after 16 hours to 0.8% C. The fact that Na_2CO_3, as well as NaOH appear to decarburize only after a certain incubation period, suggests that decarburization is not caused by the hydroxide or carbonate but rather by another, possibly absorbed compound.

Effect of Gases, Particularly Water Vapor, on the Decarburization of Carbon Steels

Gases dissolved in salt melts were suspected to have some bearing on the decarburization of carbon steel. Unfortunately, data for the solubility of gases in molten salts are rare.[5]

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H_2, O_2, N_2, CO_2, CO, H_2O, CH_3Cl and HCl were tested individually for decarburization or rectifying action in molten KCl-NaCl salt baths. No particular effects were noted with H_2 of O_2. CH_3Cl which recently had been recommended[6] for the rectification of decarburizing salt baths and HCl gas counteracted decarburization efficiently due to their acidifying property. Of particular interest, however, were reactions with N_2, CO_2 and H_2O vapor.

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When a bath containing a considerable quantity of carbonate was treated with nitrogen containing 30 mm partial pressure of water, severe decarburization occurred. After such a N_2-H_2O treatment a bath containing 1.8% $NaKCO_3$ decarburized to 0.15% C in 30 minutes at 1400°F. Before the treatment this bath was decarburizing to 0.4% C only. After exposure to the atmosphere for several hours decarburization in the bath decreased again.

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Little effect of N_2-H_2O on baths containing less carbonate was, however, noticed. In two experiments melts which contained 0.06 and 0.02% carbonate were treated with N_2-30 mm H_2O for 1-2 hours. Test samples decarburized to 0.77 and 0.76% compared with 0.81 and 0.85% in tests carried out before the treatment.

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When a decarburization test was made while dry nitrogen or CO were bubbled through a decarburizing bath, less decarburization occurred.

Part III. Measurements of Water Vapor Pressures Over Molten Salts

It was noted that molten salts, consisting of alkali and alkaline earth metal chlorides and carbonates, appeared to have appreciable water vapor pressure, the amount of which seemed to be dependent upon the composition of the bath.

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Little information is available on this subject; most observations deal with the evolution of water during heating of the salts rather than the pressure that has been observed to be present after the salts have been molten for a certain time. However, A. M. Bauman[7] and H. Von Wartenberg and

(5) See for instance: H von Wartenberg, Z. Elektrochem. *32*, 336, (1926).

(6) Paul H. Kramer (U. S. Patent 2,474,680). The Iron Age, Oct. 23, 1947, p. 52.

P. Albrecht[8] have measured the water vapor pressure over molten sodium hydroxide and potassium hydroxide, and R. H. Dalton[9] has found that molten glass, even at 1400°C, under vacuum releases gases consisting of from 20 to 94 per cent water vapor.

Equipment and Experimental Procedure

Water vapor pressures above typical commercial heat treating salt baths were determined by using a dynamic method and dew point measurements. In these experiments the mixed salts were melted in a covered steel pot heated in an electric furnace and the charge (about four pounds) was adjusted so that a minimum of 20-50 ml. of air space remained in the closed pot. After the cover was tightened on the pot, the system was flushed for about ten minutes with dry nitrogen at a rate of 25-40 ml./minute to insure complete dryness of the metal parts and of the apparatus. Then the rate of flow was reduced to approximately 5-10 ml./minute. As soon as the water vapor-nitrogen equilibrium was reached, the readings of the dew point of the gas became constant. It was attempted to have the gas displaced at least three to five times before measuring the dew point. It was noted that no significant differences arose whether the nitrogen was bubbled through or over the molten salt. In order to avoid sublimation of salt and to facilitate reading of the dew points the melts were maintained at a relatively low temperature, at 1300-1400°F, in KCl-NaCl baths.

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In previous experiments the dew point apparatus had been tested by measuring the water vapor pressure of water and ice and of oxalic acid hydrate at various temperatures.[10] The equipment used in this preliminary work was simple. Any errors introduced would tend to give low rather than high values for the water vapor pressure. Thus some water vapor might be lost through oxidation of iron of the hot cover (approx. 500°F.) and also slight sublimation of salt through the traps may have occurred and where this condensed in the colder exit tube, it may have absorbed some water from the moisture laden carrier gas.

Results and Discussion

Results for several salts and salt mixtures are given in Table 2. Column 3 of the table gives the percentage carbonates present in the bath, either as a result of the history of the bath (reaction of the bath with steel or atmosphere) or added as one of the components. Column 5 gives the duration for which the salt had been kept molten since the last addition of fresh salt. Column 6 shows the water vapor pressure of the air of the laboratory at the time the melt had last been exposed to the atmosphere. Column 7 indicates the temperature of the salt melt at the time of the vapor pressure measurement.

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In a set of dew point readings taken, the data varied within 1-2°F. The water vapor pressure was almost constant when dry nitrogen was passed over the melt at a low rate of speed. However, when nitrogen was passed over the bath for more than one hour, the water vapor pressure tended to decrease steadily. In experiment No. 8 the dew point was measured of a batch which had already been exposed to the atmosphere for 100 hours and over which nitrogen containing a partial pressure of 120 mm of water vapor had been passed just prior to the dew point determination. A slight gain in water vapor pressure of the salt was subsequently determined. This would appear to indicate that some water absorption from the air into

Table 2

Water Vapor Pressures over Various Heat Treating Salt Baths

No.	Salt[1]	Carbonate[2] %	M.P. °F	Time of heating (hrs.) since last addition	P_{H_2O} of air mm.	Temp. °F of salt bath	Dew Point T_{H_2O} °F	Dew Point T_{H_2O} mm.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	NaCl	0.015	1479	6		1530	49	8.8
				1 hr. open again			50	9.2
2	KCl	0.07	1429	2	9.2	1530	44	7.4
3	50 NaCl - 50 KCl	0.05	1225	50	12.0	1330	68	17.5
4	50 NaCl - 50 KCl + 0.5% Na_2CO_3	0.72	1225	30	9.2	1300	75	22.2
5	90 KCl-10 Na_2CO_3	10.0	(1250)	2	9.2	1440	70	18.8
	+ 20% NaCN	?	(1250)	1	12.8	1300	22	3.0
6	50 NaCl - 50 KCl + 1% org. rectifier	0.2	1225	30		1310	38	5.8
	+0.5% Na_2CO_3	0.55	1225	14		1310	56	11.5
7	50 NaCl - 50 KCl + 1% org. rectifier	0.25	1225	15	7.0	1340	52	9.9
	+ 2% Na_2CO_3	2.16	1225	14		1320	68	17.5
	+ 1% org. rectifier	1.80	1225	3		1310	63	14.7
8	50 NaCl - 50 KCl	0.07	1225	100	7.0	1310	72	20.1
	+ 16 lt. N_2-120 mm H_2O		1225	102		1330	72	20.1
	+ 9 lt. " "	0.20	1225	104		1400	78	24.6
9	$BaCl_2$	0.1	1764	1		1800	40	6.3
10	55 $BaCl_2$-18 NaCl-27 KCl	?	1020	50	5.7	1350	39	6.1
11	68 $CaCl_2$-32 NaCl	1.0	950	2		1290	37	5.6

1) NaCl (No. 1) was C.P. grade, while the rest were commercial grade.
2) by titration, expressed as Na-K-carbonate.

(7) J. Appl. Ch., USSR, *10*, 1165 (1937); C.A. *32*, 2415 (1938).
(8) Z. Elektrochem. *27*, 162 (1921).
(9) J. Am. Chem. Soc. *57*, 2150 (1935).
(10) Exact data for oxalic acid are reported by: G. P. Baxter—J. E. Lansing, J. A. Chem. Soc. *42*, 419 (1920) and G. P. Baxter—W. L. Cooper, J. Am. Chem. Soc., *46*, 923 (1924).

the melted salt can take place. All the results point to the fact that the equilibrium water vapor pressure is dependent to a great extent upon the composition of the melt. It is interesting to note that both NaCl and KCl (exp. 1 and 2) had low water vapor pressures at a temperature about 100°F higher than the melting point of these salts. On the other hand their eutectic mixture (50 KCl—50 NaCl) showed a much higher value also at approximately 100°F above the melting point (No. 3/8). It would appear that higher carbonate content in NaCl-KCl mixtures favors higher water vapor pressures (exp. 4, 5 vs. 3). The effect of carbonate is interesting in view of the fact that the carbonate content gradually increases in these molten salts when they are exposed to the atmosphere.

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Addition of rectifiers to the melt, on the other hand, tends to reduce the water vapor pressure (compare exp. 5, 6, 7) which is again increased on subsequent addition of carbonate (6, 7). The rectifiers (cyanides or complex organic compounds) decompose and the gaseous decomposition products appear to carry out some of the dissolved water. Rectifiers are added to commercial heat treating salts to prevent decarburization of carbon-steels.

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The temperature coefficient of these water vapor pressures seems to be rather small as some measurements had shown when observing the same melts (50-50 KCl-NaCl) at various temperatures between 1250 and 1450°F. Although the measurements of Von Wartenberg and Albrecht[8] on NaOH and KOH indicate dissociation pressures of the same magnitude as the water vapor pressures reported here, it appears unlikely —based on the above observations —that the water vapor pressures reported are due to the dissociation of NaOH-and KOH. Only occasionally had hydroxides been detected in the melt (by titration) and certainly not in bath #3 which contained 0.05% carbonate only but had a very high water vapor pressure. No attempt had been made to determine the actual amounts of water in the melt. It is, however, possible to make at least a rough estimate based on a few experimental data showing how the water pressure decreased with prolonged bubbling of gas over or through the melt. Assuming Henry's law to be valid the mole fraction of water dissolved in decarburizing salt appears to be of the order of at least 10^{-4}.

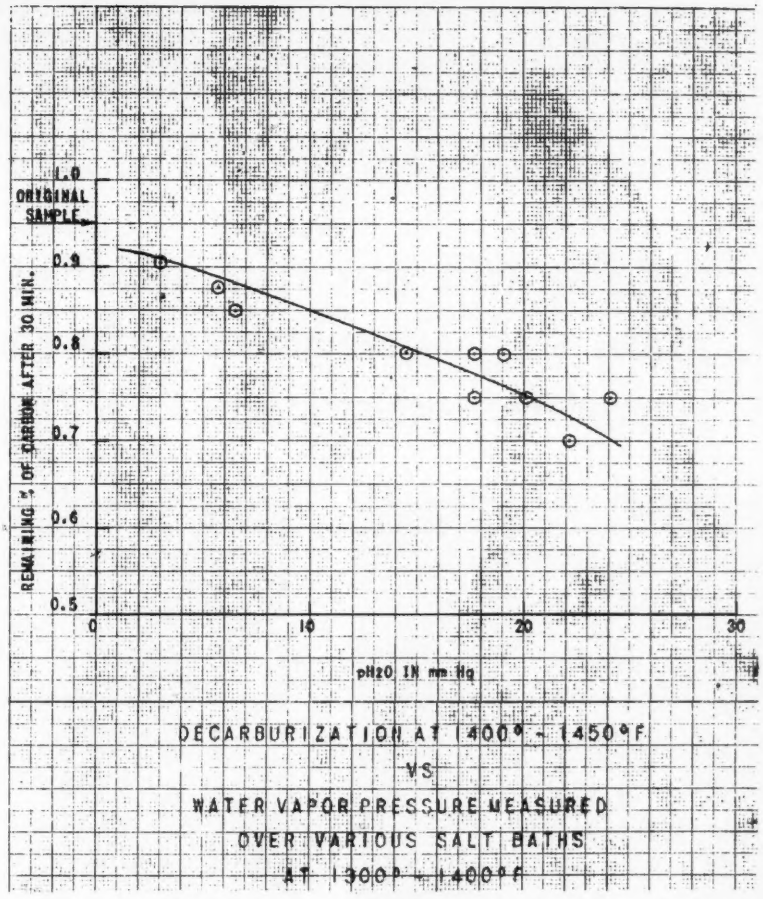

Figure 2.

Water Vapor as Possible Decarburizing Agent

It had been reported above (II) that water vapor pressure measurements made over salt baths of varying composition showed values of the order of the water vapor pressure of the surrounding atmosphere or higher. Highest water vapor pressures were determined over decarburizing baths.

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The temperature at which the dew point measurements had to be conducted for NaCl-KCl baths 1300-1400°F was, unfortunately, too low for decarburization tests with steel samples. However, in order to obtain a correlation between water vapor pressure and decarburization in a certain bath, the vapor pressure measured at 1300-1400°F have been plotted against the results of decarburization tests carried out at 1400-1450°F. A correlation is indicated in Figure 2, although some of the vapor pressure data are taken from baths in which equilibrium with water vapor may not have been attained because of insufficient time since the last addition of fresh salt to the bath (column #5, Table 2).

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An analysis of the gaseous products of a decarburization reaction should indicate whether water vapor is acting as decarburizing agent. An experiment was made in which 1-lb. of high carbon drill

(*Please turn to page* 921)

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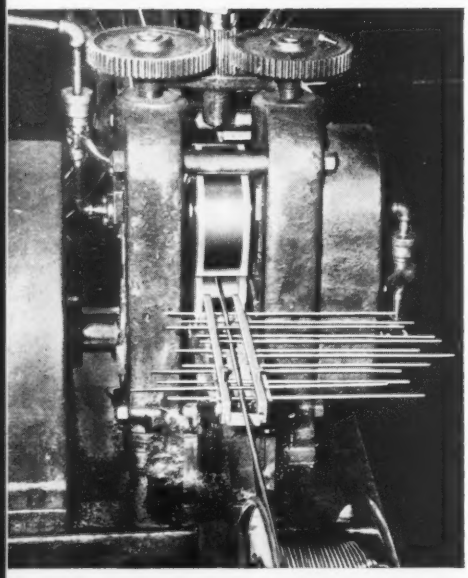

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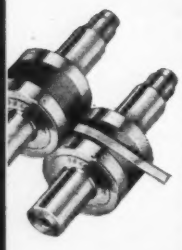

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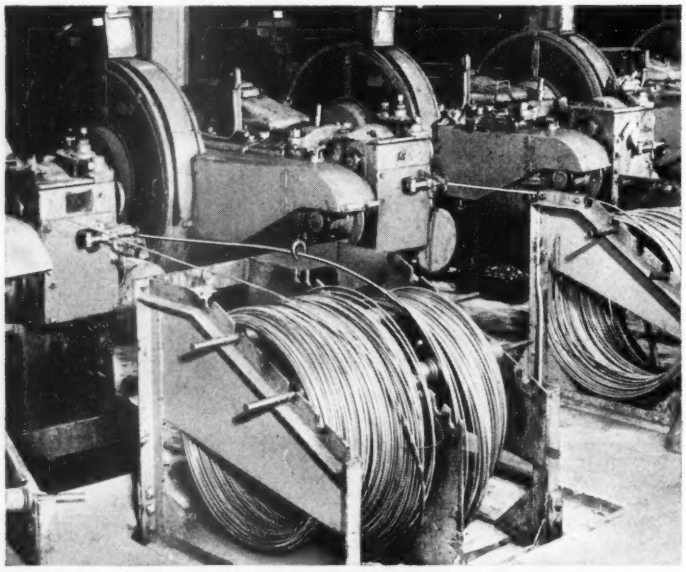

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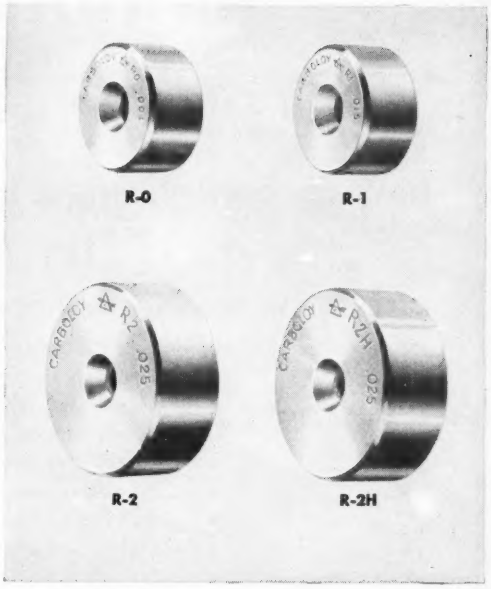

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Note: The first three papers in the "ferrous" list will also interest non-ferrous men.

OTHER FEATURES

Annual Luncheon at which the Mordica Memorial Lecture will be delivered and awards for meritorious papers made.

The annual business meeting of the members of The Wire Association.

The annual "Stag-Smoker" Dinner with good fun and fellowship for all. A fine show is promised.

The annual meeting of the Board of Directors of the Association.

IT WILL BE A TOP-NOTCH CONVENTION. PLAN TO BE THERE.

THE WIRE ASSOCIATION

RICHARD E. BROWN, *Executive Secretary*

453 MAIN STREET **STAMFORD, CONN.**

ISA Publishes "Principles of Automatic Control"

A new booklet entitled "Principles of Automatic Control" by **G. F. Akins** has just been published by the Instrument Society of America, 1319 Allegheny Ave., Pittsburgh 33, Pa.

★ ★ ★

This 32 page booklet is the text of the popular color and sound film "Principles of Automatic Control" produced by the Society. The film which shows and describes in detail (1) Justification of Automatic Control; (2) Design of an Automatic Controller; and (3) Application of a Controller to a Process has been shown throughout the United States and Canada to company instrument trainees and college students.

★ ★ ★

As it presents a clear and concise picture of the fundamentals of automatic control, this illustrated booklet should prove very helpful to students, technical personnel, instrument mechanics, production supervisors and operators.

★ ★ ★

The sale price is $1.25. Orders for five to ten copies are $1.00 each. Special quantity prices will be quoted.

Symposium on Conditioning and Weathering

Many of our highly useful engineering materials are affected by atmospheric influences, mostly adversely. A wide variety of materials such as paper, adhesives, textiles, plastics, cement, electrical insulating materials, all require temperature and humidity conditioning prior to if not during testing. Because of this need, this Symposium was sponsored by ASTM Committee E-1 on Methods of Testing. Its principal purpose is to provide valuable knowledge in this field. It is hoped that this program will promote an expanded understanding of the importance of conditioning and weathering in the assessment of our materials of engineering and will encourage further effort to utilize controlled atmospheric phenomena in our laboratory procedures.

★ ★ ★

The titles and authors of the papers are as follows:

Fundamentals of Atmospheric Elements—B. C. Haynes, Chief, Observations Section, U. S. Weather Bureau, Washington, D. C.

Air Conditioning in the Manufacture and Testing of Textiles—R. H. Brown, Executive Engineer, Parks-Cramer Co., Fitchburg, Mass.

Conditioning and Weathering of Paper—William R. Willets, Assistant Manager, Technical Service Laboratories, Titanium Pigment Corp., New York, N. Y.

Conditioning and Weathering of Adhesives and Plastics—Frank W. Reinhart, Chief, Organic Plastics Section, National Bureau of Standards, Washington, D. C.

Weathering of Some Organic Coatings —E. J. Dunn, Jr., Research Laboratories, National Lead Co., Brooklyn, N. Y.

Weathering Tests on Metallic Coatings—William Blum, Consultant, retired from National Bureau of Standards, Present address, Chevy Chase, Md.

Laboratory Air Conditioning—A. E.

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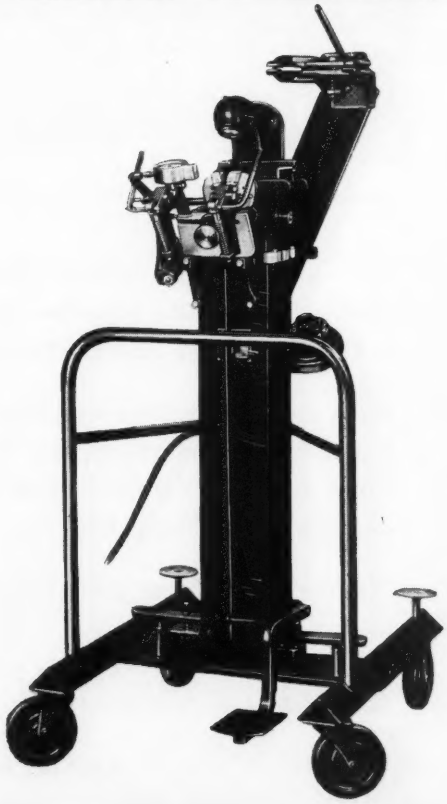
MODELS J-3-S and J-4-S AUTOMATIC MICRO-WELD BUTT WELDERS

These welders are used for welding high and low carbon STEEL, and STEEL ALLOY wire, ranging in size from .020" to .160" diameter. All operations on these units, which include the clamping of the wire being welded, contacting the welding switch, and upsetting the weld, are made by a single downward stroke of the foot pedal. Welders for high carbon steel wire are equipped with the exclusive MICRO-WELD Dial indicating annealing device to facilitate the annealing operation of high carbon wire.

Standard equipment with these units include annealing dies, filing vise, light extension cord, and mounting on a 4-wheel truck. Special units can be furnished for crane mounting.



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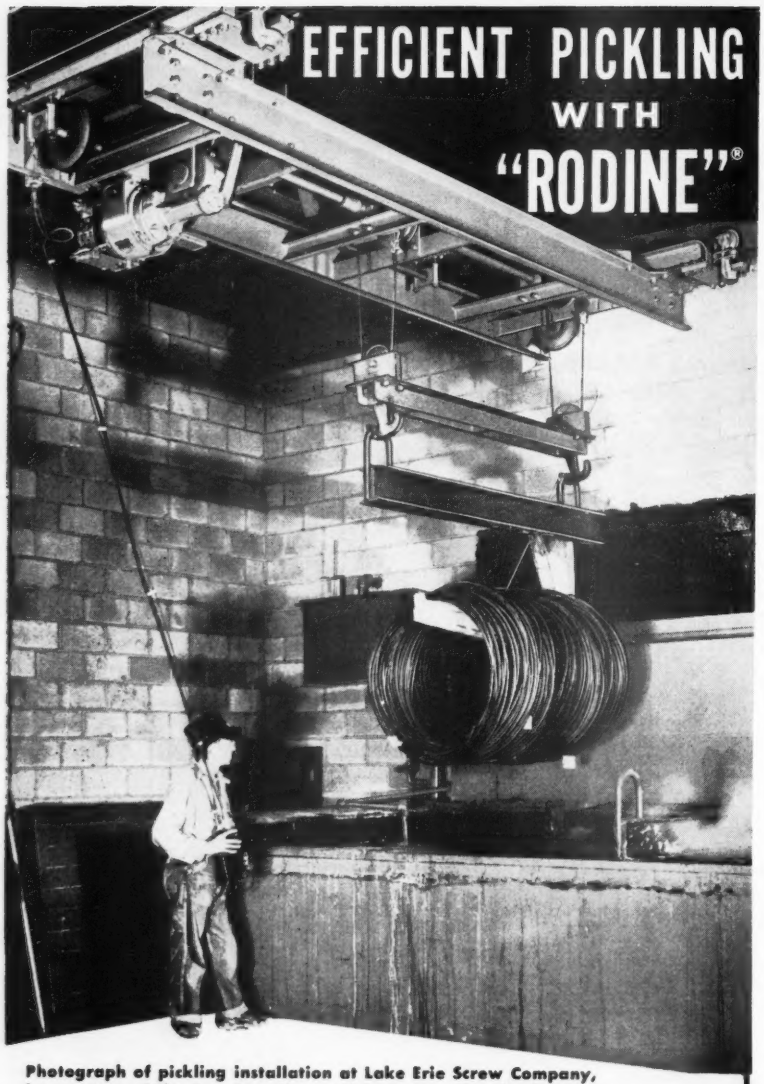

Photograph of pickling installation at Lake Erie Screw Company, by courtesy of The American Monorail Company, Cleveland, Ohio.

Rod and wire are pickled clean in "Rodine"-inhibited acid without waste of either acid or metal. Breakage in drawing, from acid brittleness, is minimized.

Wire and rod, pickled with "Rodine", as compared with less effective inhibition, are larger in diameter, and when drawn to the finished gauge the coils are longer and correspondingly heavier.

"Rodine" more than pays for itself in savings of acid and metal.

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Stacey, Jr., Senior Consultant, Carrier Corp., Syracuse, N. Y.

Development of a Moisture Resistance Test—Charles P. Lascaro, Assistant Chief, Materials Section, Components and Materials Branch, Squier Signal Laboratory, Fort Monmouth, N. J.

Outdoor Exposure Testing on Racks and Test Fences—K. G. Crompton, Bell Telephone Laboratories, Murray Hill, N. J.

Accelerated Weathering Devices—Roscoe H. Sawyer, Manager, Technical Division, Devoe and Raynolds Co., Inc., Louisville, Ky.

Copies of this 104-page Symposium, heavy paper cover, can be obtained from Headquarters of the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., at $2.25 each.

A. S. & W. Expanding Facilities

A major step in modernizing and expanding production facilities of American Steel & Wire Division in Cleveland was announced recently by Walter F. Munford, president of this division of United States Steel Corporation.

★ ★ ★

A new rod mill will be constructed on properties of the present Cuyahoga Works on East 49th Street, south of Harvard Avenue, and will substantially increase the plant's rod production, as well as replace older equipment.

★ ★ ★

The new facilities, which will include a combination rod mill, billet storage areas, and rod storage areas, will have a rated capacity of 450,000 tons per year compared to the present equipment which dates back to 1916 and has a rated capacity of 313,000 tons a year.

★ ★ ★

The new mill will incorporate the latest facilities, equipment and methods to effect maximum efficiency in production and further increase the quality of American Steel & Wire products.

★ ★ ★

Electronic and the latest automatic controls will be used extensively in the heating, working and cooling processes in the new mill to produce a quality product at mile-a-minute speeds.

★ ★ ★

Steel billets which must be heated before being rolled into rods will be conveyed through a huge furnace divided into multiple heat zones whose temperature will be closely controlled, much in the manner in which the housewife slowly roasts and then quickly browns a turkey.

★ ★ ★

The new facilities will handle billets 3¼ inches square and 30 feet long, weighing 1,050 pounds each. Presently billets weigh 600 pounds.

★ ★ ★

Using a combination of reducing stands, the new mill is expected to send the rod speeding to the take-up reels at a rate in excess of sixty miles an hour. This is in contrast to present equipment where speeds range up to thirty-five miles a hour.

Big Reel of Rope Shipped to Jamaica

One of the longest lengths of 1½-in. wire rope ever wound on one reel was shipped from New York recently for use in an unusual bauxite mining operation of Reynolds Jamaica Mines, Ltd., in Jamaica. The S. S. Cape Cumberland carried the shipment.

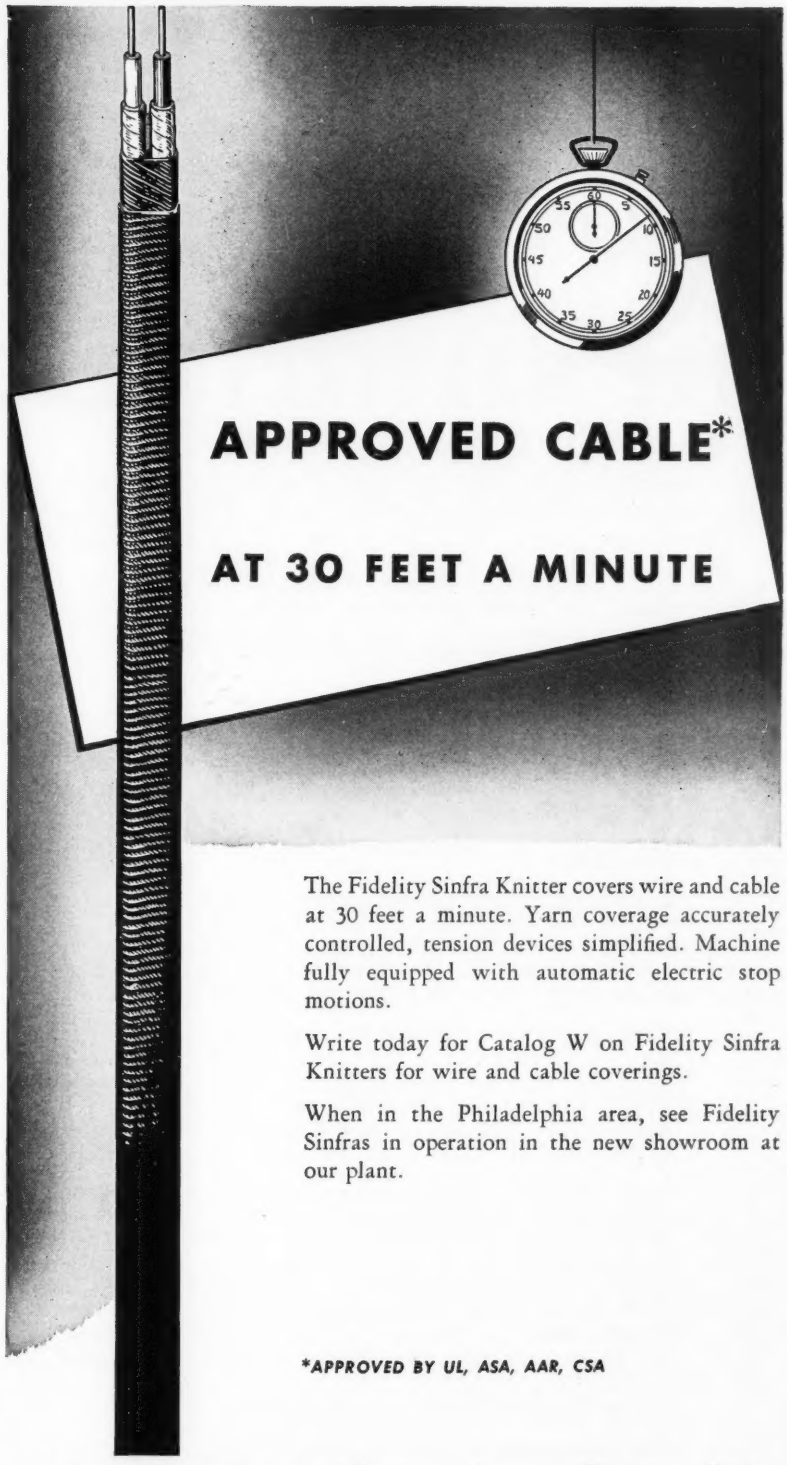
★ ★ ★

The big reel, nine feet in diameter, contained 15,500 feet of wire rope made at the Williamsport, Pa., plant of Bethlehem Steel Company and freighted to New York by rail. It weighed 31 tons. Four other reels, each bearing 14,000 feet of wire rope and weighing nearly 28 tons, are being shipped to the same installation at different times.

★ ★ ★

The total shipment of 71,500 feet—nearly 14 miles—of steel rope will become part of the world's largest monocable tramway, extending 6½ miles from the bauxite mine to a shiploading terminal at Ocho Rios, near the exotic Tower Isle resort on Jamica's north coast. The aerial tramway is required because of terrain too rugged for direct highway or rail transportation.

★ ★ ★



The Fidelity Sinfra Knitter covers wire and cable at 30 feet a minute. Yarn coverage accurately controlled, tension devices simplified. Machine fully equipped with automatic electric stop motions.

Write today for Catalog W on Fidelity Sinfra Knitters for wire and cable coverings.

When in the Philadelphia area, see Fidelity Sinfras in operation in the new showroom at our plant.

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An Open Letter to WIRE MANUFACTURERS

Gentlemen:

Whenever you sell non-metallic sheathed cable, armored cable, or building wire to an electrical contractor, the first thing he looks for is the Underwriters' label. That label tells him that the electrical, moisture-resistant, flame-proofing, and other similarly important requirements have been met. But when the contractor actually begins to install the wire, he is then more concerned with its workability during installation:

Is it sticky in coils or on reels and spools?
Does the finish flake off when the wire is bent or pulled through joists?
Does it mark up walls?
Does it make workmen's hands unduly dirty?
And above all--does it cost the contractor overtime?

The Underwriters' label can't tell him these things; he finds them out by experience. And if experience provides the wrong answers, then your wire --as good a product as it is in itself--gets a bad name. Avoid such complications by making these checks:

Are your present saturants and finishes the most suitable materials for your products and methods of application?
Are you misapplying a saturant? ...using one designed for cotton on glass braid, for instance?
Are you getting all that you are paying for?

If you are not obtaining satisfactory performance from your present saturants and finishes, please write to us. We maintain a highly-trained technical staff which devotes its time to perfecting paints, varnishes, and saturants to meet particular requirements. At no obligation, we will be happy to run a series of tests and then make specific and impartial recommendations as to the materials and methods best suited to your own situation.

Cordially,

E M Paschall

President

EMP:GC

Solar Compounds Corporation
Solar Varnish Corporation
The Originator of Wire Color Solutions
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Moving on an average downgrade from a valley at 1,100 feet altitude, the ore is conveyed in carriages spaced at regular intervals on the wire rope, which will be spliced into two separate endless loops on the site.

★ ★ ★

The tramway has two tangent sections. The upper, about 27,000 feet long, requires 56,000 feet of rope including splicing and terminals; the lower, 7,500 feet long, requires 15,500 feet of rope.

★ ★ ★

To make up the longest loop, the four 14,000-foot lengths of wire rope will be spliced together in the field to form a continuous length of 56,000 feet. The 15,500-foot length is long enough to make the complete loop for the lower section of the tram.

★ ★ ★

The rope rides on idler sheaves placed near the top of towers up to 125 feet high. At an angle station the bauxite carriers are transferred automatically from one tramway section to the other.

★ ★ ★

The size and weight of the reels present problems in transporting them by truck from the port at Ocho Rios through rankly forested Fern Gully. Abrupt turns in the crooked road will require skillful back-and-forth maneuvering by the truck driver en route to the mine.

★ ★ ★

The bauxite is shipped to Gulf ports for reduction into alumina at plants of Reynolds Metals Company, parent of the mining subsidiary. The scheduled output of the mine is 1,000,000 tons of ore annually.

Booklet on Corrosion Resistance of Copper and Copper Alloys

For twenty-seven years, continuous laboratory research and field study of the nature of corrosive attack on copper and copper alloys have been conducted by The American Brass Company's technical staff. The results of this study have recently been brought

up to date in a new 28-page booklet, "Corrosion Resistance of Copper and Copper Alloys." This publication, first of its kind in the industry, explains the chemical and physical nature of corrosive attack in its various forms.

★ ★ ★

Included is a tabulation indicating the relative corrosion resistance of the principal types of copper and copper base alloys when in contact with 183 different corroding agents.

★ ★ ★

In the recently-released, revised edition, more complete information has been added on stress-corrosion cracking, galvanic corrosion, fresh and salt water corrosion. A section has been added on the subject of atmospheric corrosion. The section on corrosion in petroleum refineries has been completely revised.

★ ★ ★

This booklet, Publication B-36R, is available without charge from The American Brass Company, Waterbury 20, Connecticut.

Special Condensed Price List and Catalog Issued by Carboloy

A special condensed price list and catalog—the "Brief-A-Log"—which includes details on all new price adjustments and specifications of its standard cemented carbide tools and blanks is announced by the Carboloy Department of the General Electric Company.

★ ★ ★

Besides listing the products affected by recent price cuts, and the new lower prices, the 20-page "executive's briefer" provides essential buying information required in specifying cemented carbide tools and blanks.

★ ★ ★

The publication, GT-265, is a simple-to-use, condensed catalog designed to bring the user up to date quickly. It places important information at the user's fingertips almost as simply as actuating a selector desk pad. A special, visual-aid type index which separates tools from blanks conveniently, facilitates the use of the "Brief-A-Log".

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RODINE

Reg. U.S. Pat. Off.

"Rodine" more than pays for itself in savings of acid and metal. More uniform pickling and better pickled surfaces are obtained when "Rodine" is used in acid pickling baths.

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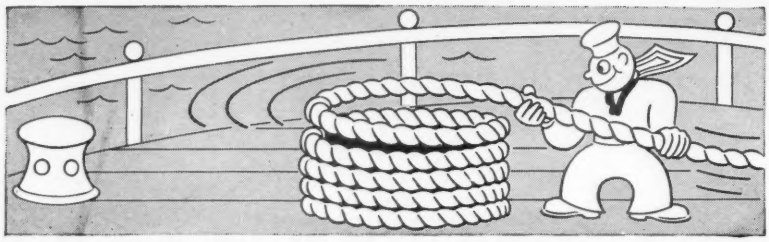


For a spring with accurate coiling see the man with a

Versatile Torrington Spring Coiler

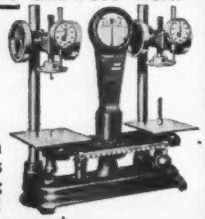
In spring coiling, the words "Torrington" and "Versatile" are synonymous! When you desire springs produced to meet exacting requirements, just call the professional springmaker who has a Torrington coiler. He's the man who can fill your needs with accuracy, speed and economy. On special springs, our sales department will gladly assist you in finding a source of supply, or help your springmaker devise just the right tooling to produce it.

Torrington's 14 different Spring Coilers cover a range of wire diameters from .003" to .750"

MODEL W-11 SPRING COILER

Wire diam. range: .015" to .072". Length per spring: 0" to 42". O. D. Coil Range: 3/32" to 1 9/16". Produces 23 to 190 springs per minute with variable speed drive. Extra wire feed gears, torsion, other attachments available.

NOW... Spring Makers and Users can get the same answers with The TORRINGTON SPRING TESTER



An accurate, uniform and inexpensive means of measuring spring load and deflection! For inspection or in-use testing . . . to aid in designing and developing springs for specific uses or as a basis for statistical quality control. Write today for illustrated bulletin on the Torrington Spring Tester!

The TORRINGTON MANUFACTURING COMPANY TORRINGTON, CONNECTICUT

New Type Cable for Harbor Defense

Underwater detection systems for harbor defense are made more efficient, economical and safer and easier to install by the use of new type submarine cable insulated with Bakelite polyethylene plastic and jacketed with a Vinylite resin compound. Lower in original cost, the new type cable has longer storage life than conventional type cable because of the Vinylite resin compound's resistance to sunlight, cold temperatures, moisture and other aging factors. The toughness, flexibility and abrasion-resistance of the outer jacket help reduce the tendency of the cable to kink when being laid. The jacket made of Vinylite resin compound is also smooth and non-adhesive, providing safer and quicker handling than conventional, tar-coated cable. Harbor defense cable must be strong and rugged, for although it seldom extends more than 10 miles, it is laid in strategic spots where it may have to bridge gulfs in the harbor floor and there is danger of fouling by anchors.

★ ★ ★

In the center, depending on the type of underwater detection device to which the cable is attached, are from one to 16 copper conductors. These are covered with polyethylene plastic which has dielectric properties permitting higher voltages to be carried with lower signal loss than in conventional cable of the same size. Strips of polyethylene plastic fill the space around the conductors for added strength and protection. Connected to any one of a number of sonar, magnetic or electromagnetic detection devices, the cable carries signals from the strategically situated instrument to a shore station where the signals are recorded or made observable in other ways. Similar to a radar warning net for air defense, this system for U. S. Navy Harbor Defense has a plotting center where unidentified underwater targets are tracked, and their position, speed, direction, reported to the proper authorities. The Ansonia Wire & Cable Company, Ansonia, Conn. is one of several firms producing this cable.

Roebling Speeds Steel Testing

Traveling faster than a man can run, open hearth steel samples now speed from furnace to laboratory—a distance of about a tenth of a mile—in less than 20 seconds via pneumatic tubes at the Roebling, N. J., steel mill of the John A. Roebling's Sons Corporation.

★ ★ ★

The newly-installed system simplifies the problem of maintaining a consistently high-quality steel by permitting more frequent quality-control checks. Several samples may now be checked in the time it formerly took to check one. The pneumatic tube system will step up our overall steel production, and also cut out a sizable amount of human drudgery.

★ ★ ★

Because of precision control throughout its manufacturing operations, the John A. Roebling's Sons Corporation, recently acquired by CF&I, has built an enviable reputation for high quality in its diversified line of electrical wire and cable, cold rolled strip, round, flat and shaped wires, wire rope and strand, and bridge construction materials.

★ ★ ★

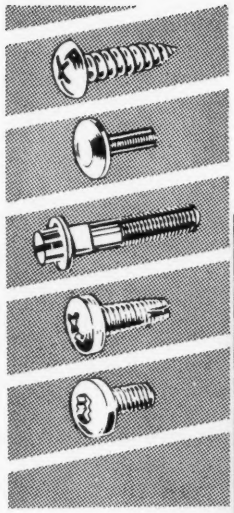
Installation of the new pneumatic tube sampling system is part of a broad program of expansion and modernization of present facilities currently taking place throughout the 12 plants of Colorado Fuel and Iron, which now has the ninth largest steel producing capacity in the U. S.

Beryllium Corp. Expanding Production and Research Facilities

The Beryllium Corporation, Reading, Pa., is planning an extensive modernization and expansion program, and in the field of research, is investigating other materials with the aim of diversification.

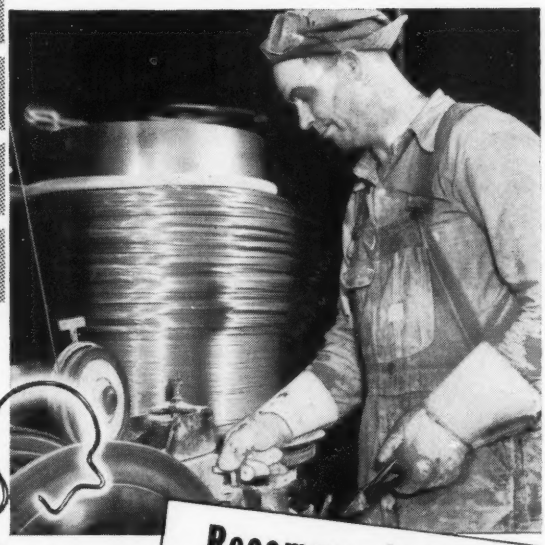
★ ★ ★

The company has ordered a specially designed hydraulic extrusion press. This unit will produce alloys in the form of rod, special shapes,



KEYSTONE

"SPECIAL PROCESSED"
COLD HEADING WIRE



Recommended for Your Difficult Cold Heading Jobs

The severe displacement of metal during the cold heading process requires wire that has been designed *specifically* to meet the requirements of your product. The following analysis of Keystone "Special Processed" Cold Heading Wire is recommended for difficult cold heading:

C1006 - C1012 for Clutch Heads
C1006 - C1022 for Phillips Heads
C1006 - C1022 for Struck Slot Heads
C1108 - C1109 for Phillips Head Wood Screws
C1035 - C1038 for Heat Treated Screws and Bolts

The excellent grain flow properties of this wire assures the desired upsetting and die forming qualities you need for greater efficiency in your particular operation.

INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

THE DOLLARS YOU SPEND ON REELS GET THE MOST WHEN YOU BUY NARCO METAL BOUND REELS

Narco Metal Bound reels last three to four times as long as all wood reels. A 36" Narco Metal Bound reel will make four trips for every one trip obtained from a 36" all wood reel. Narco Metal Bound reels require no repairs. The initial cost is the only cost of the reel. Substitution of 36" Narco Metal Bound reels for 36" all wood reels reduced the cost per trip of this diameter reel for one company from $2.91 to $.80.

Further information or quotation furnished on request.

North Anson Reel Co.

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wire, structural sections and beryllium alloy tubing.

★ ★ ★

Another important unit on order is a Sendzimer mill to roll strip up to 11½ inches in width at speeds of 200 feet per minute. This unit will produce fine gauge strip with special tolerance control. Other programmed additions include two pass mills.

★ ★ ★

A new 4,000-pound furnace for casting ingots is also expected to be added. Other additions planned include electronic control apparatus, bar finishing equipment, and laboratory equipment for high speed spectrographic analysis of molten charges and at various stages of fabrication.

★ ★ ★

Current research projects by the Beryllium Corporation include investigation of methods for increasing the yield of oxide from beryl ore, improvements in techniques for the manufacture of beryllium alloys, and development of alloys of low beryllium content. New materials are under investigation for special alloying purposes, such as ferro-beryllium as an additive to certain special steels. Alloys containing no beryllium, but which have some properties akin to the beryllium-bearing alloy systems, constitute another project. Among these alloys are titanium-bearing copper alloys and other complex alloys which are compatible in manufacturing practices with beryllium-copper alloys.

★ ★ ★

For further diversification, work is also being done on alloys of aluminum titanium, zirconium magnesium and aluminum manganese as master additives to other metals. In conjunction with this, work is being done on some rare earth group elements for specific alloying purposes covering a large variety of potential applications and on a program covering the uses and applications to which the products may be put.

Fifth International Mechanical Engineering Congress

The fifth International Mechanical Engineering Congress is to be held in Turin, Italy, from 9 to 15 October 1953, during the Salone Internaziona della Tecnica so that participants will be able to visit this important exhibition.

★ ★ ★

The Congress this year will be organised by the Associazione Industriali Metallurgici Meccanici Affini on behalf of the Organising Committee, and will have as its theme:

"Production and Assembly Methods for Components in Mechanical Engineering."

★ ★ ★

This will cover examination and comparison both from the technical point of view and from the standpoint of production costs, of the various methods available to industrialists for the design and manufacture of components. It will not cover raw materials, measurements, inspection, tests or erection.

★ ★ ★

Those desiring further particulars of the Congress are invited to communicate with: The Permanent Secretary, International Mechanical Engineering Congress 10, Avenue Hoche, Paris VIII eme, France.

Activities of ASTM B-1 Subcommittees

Subcommittee II on Methods of Test and Sampling Procedures (J. B. Dixon, Chairman) completed preparation of the proposed revision of Specification B3 to incorporate statistical sampling procedures, completed its review of the proposed Tentative Method for Determination of Cross-Sectional Area of Stranded Conductors (Accepted by ACS, 3/10/53), and is considering the desirability of ultimately developing statistical sampling procedures for tinned copper, alloy-coated copper, and hard-drawn aluminum wire.

★ ★ ★

Subcommittee IV on Conductors of Copper and Copper Alloys (B. J. Sirois, Chairman) completed

High Quality High Carbon Wires
Someone has come up with the useful information that headaches come in forty-seven different types.
Through the years, we have had all forty-seven here at Johnson. But we are glad to report that although we have found, as others have, that, with manufacturing, invention and progress, there inevitably come headaches, these have been overcome. To get personal for a moment—today our head is clear as a bell.
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JOHNSON STEEL AND WIRE COMPANY, INC.
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New York Philadelphia Cleveland Detroit Akron Chicago
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A SUBSIDIARY OF PITTSBURGH STEEL COMPANY

NEW AO ELDER

DIE-ANGLE SCOPE

Developed and manufactured under license with Mr. Flint C. Elder, former Director of Research at American Steel and Wire Company.

Checks Carbide Die Entrance Angle

. . . INSURES WIRE QUALITY

Now die entrance angles can be carefully checked in less than one minute with the new DIE-ANGLE SCOPE. Even unskilled operators with only a few minutes' instruction can make measurements to an accuracy of ± 10 minutes of arc. The die is *not* damaged in any way. Multiple angles and poor polish are obvious immediately. Every size of die—down to the smallest at .005"—can be measured accurately.

THINK WHAT THIS DEVELOPMENT MEANS to you in more efficient control of wire drawing processes—in higher quality, reduced spoilage, *greater profits*. Here for the *first* time is a practical shop instrument for checking carbide die entrance angles *before* they can affect wire quality.

The AO Elder Die Angle Instrument is compact, portable simple to operate, and, like all AO Scientific Instruments, *dependably accurate*. It is sturdily constructed of lightweight aluminum castings, with integral light source and transformer. Supplied in leatherette carrying case. Write *today* for free literature.

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American Optical COMPANY

INSTRUMENT DIVISION • BUFFALO 15, NEW YORK

preparation of the proposed Tentative Method of Test for Stiffness of Bare Soft Square and Rectangular Copper Wire for Magnet Wire Fabrication, and revisions of specifications to cover the addition of a 55 per cent conductivity alloy for bronze trolley wire, and the addition of a figure-9, deep-section bronze trolley wire.

★ ★ ★

Subcommittee VII on Conductors of Light Metals (P. V. Faragher, Chairman) has completed development of a ductility (brittleness) test requirement for hard-drawn aluminum wires, is working on the standardization of direction of lay of stranded aluminum conductors, standardization of large sizes of stranded aluminum conductors, standardization of additional constructions of ACSR conductors, preparation of a proposed specification for annealed or one-quarter hard aluminum wire for telephone cable applications, and is considering the development of specifications for aluminum wire to be used in magnet wire.

Stainless Steel Output Is Rising at 16% Yearly Rate

The production of stainless steel ingots increased an average of 16 per cent a year from 1940 to 1951, according to statistics by American Iron and Steel Institute. At the same time the total physical output of the country increased an average of 5 per cent a year, according to the Department of Commerce. Stainless ingots are converted by the steel industry to nearly all the forms in which other steel is sold, such as bars, rods, wire, sheets, pipe, etc.

★ ★ ★

Since 1935, when the official statistics on stainless steel were first compiled, the ingot output of this metal has increased more than 12 times to a total of approximately 930,000 net tons in 1952, compared with the record high of nearly 934,000 tons in 1951. The combined output of two light metals, including primary and secondary or reclaimed metal, set a record in 1952 over 1.3 million tons, nearly 12 times the 1935 production.

Outstanding Personalities of the Wire Industry

Added to Firth Sterling Staff

Firth Sterling Inc. has appointed Robert E. Kimmins as Assistant to the Steel Sales Manager. In this capacity he will take over the responsibilities of the Company's High Temperature Alloy Steels.

★ ★ ★

Mr. Kimmins has just been released from active duty as a Navy Lieutenant Commander. He was with the Aircraft Production Resources Agency at Wright Field where he was in charge of the Ferrous Metal Section, which included High Temperature Alloys.

★ ★ ★

Before Mr. Kimmins was called to active duty with the U. S. Navy in 1951, he was Executive Assistant at the Expanded Metal Engineering Company, in Long Island, New York.

American Brass Appointments

Arthur H. Quigley, chairman of the board of The American Brass Company, has announced the following promotions in his organization:

Richard F. Puffer was named assistant general sales manager; **Allen W. Rockwell** has been made manager of the Waterbury Branch; and **Robert R. Vance** will succeed Mr. Rockwell as works manager of the Waterbury Branch.

★ ★ ★

Mr. Vance is a native of Taunton, Massachusetts. He attended Taunton High School, and in 1932 was graduated from Northeastern University.

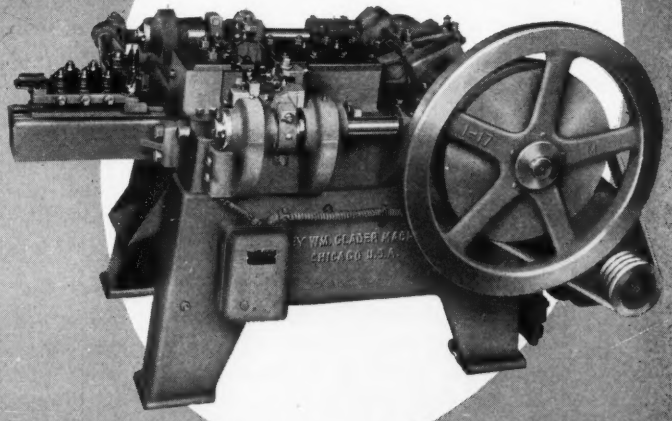
★ ★ ★

He became an employee of the Wire Mill of the Waterbury Branch in 1937. The next year he was made night foreman of the Extrusion Department of the West Tube Mill. In 1940 he was transferred to the Mechanical Department, and in 1943 was made economy supervisor of the Waterbury Branch, which position he has held until now.

Maibauer Advanced by Bakelite

Appointment of **Albert E. Maibauer** as Manager, Wire and Cable Materials Division, is announced by **C. W. Blount,** Vice President in Charge of Sales, Bakelite Company, a Division of Union Carbide and Carbon Corporation. Mr. Maibauer joined Bakelite Company in 1925 following his graduation from The Cooper Union. Mr. Maibauer was previously Assistant to the Manager of the New York Sales Development Group and succeeds **J. E. Brister** in his new position.

high efficiency — low cost
with GLADER wire nail machines



Eliminate costly down-time in the Nail Mill by replacing obsolete machines with new GLADER NAIL MACHINES . . . For tops in efficiency and economical operation use GLADERS.

WM. GLADER
MACHINE WORKS

210 N. RACINE AVENUE • CHICAGO 7, ILLINOIS

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

Made Assistant Works Manager

J. W. Campbell has been named assistant works manager of The Colorado Fuel and Iron Corporation's Wickwire-Spencer plant in Buffalo, New York, it was announced by **J. J. Martin,** vice president in charge of operations for CF&I.

★ ★ ★

Mr. Campbell assumes his duties as second in command of CF&I's second largest plant after 27 years of service with the corporation. Since 1950, he has been wire mill superintendent of the Buffalo plant.

★ ★ ★

After joining the testing department of the Goddard Works of Wickwire-Spencer in Worcester, Massachusetts in 1926, Mr. Campbell moved to Buffalo in 1939. He served as assistant superintendent of the wire mill from 1947 until 1950, when he was named superintendent.

★ ★ ★

Mr. Campbell is a native of Worcester and attended Northeastern University. He is a member of the Wire Association and the Association of Iron and Steel Engineers.

Appointments by Handy & Harman

M. W. Townsend, Sales Manager since 1951, has been appointed Assistant to the President of Handy & Harman, processors of silver, gold and platinum. With the company since 1946, he first joined the sales department and three years later was made Assistant to the Vice-President in charge of sales.

★ ★ ★

Paul G. Feld has been appointed Sales Manager to succeed Mr. Townsend. He joined Handy & Harman's Chicago industrial sales force in 1945. In 1950 he became supervisor of industrial sales in the Chicago territory and recently came to New York as Assistant to the Sales Manager.

★ ★ ★

Appointments became effective August 1st; both men will be located at the company's offices in New York.

Appointed Purchasing Agent for Macwhyte

Announcement has been made that **John W. Goodwin** has been appointed Purchasing Agent for the Macwhyte Company, Kenosha, Wis., to succeed the late Charles F. Lamich.

★ ★ ★

John Goodwin has a long record of service with Macwhyte, manufacturers of wire rope. He was first employed as office clerk in June of 1935 part-time while attending school and also was storeroom clerk.

★ ★ ★

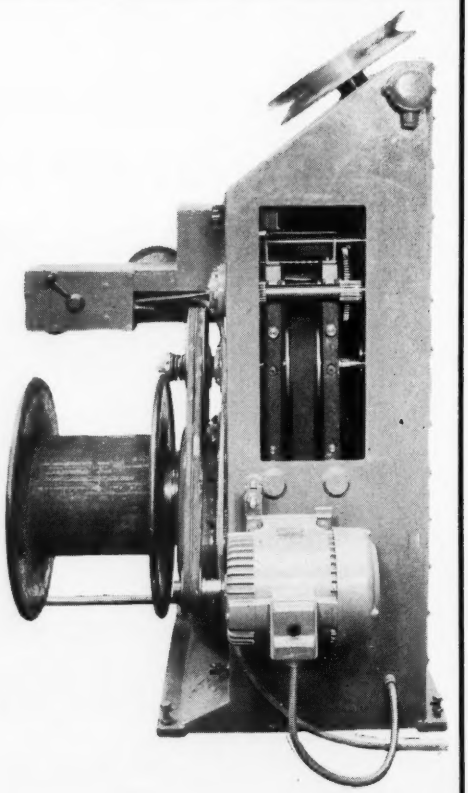
He has attended Wisconsin University and Marquette University. Recently he completed a course in Industrial Purchasing at the Robert A. Johnson College of Business Administration, Marquette University.

POURTIER SHOWS TO U.S.

his Take-up for Tinned Wires

- Instead of receiving in coils the tinned wire, you will save one rewinding operation by using our patented device. You will receive directly on drums up to 30", wires from 8 to 22 Awg.
- Constant linear speed: no capstan, no contact on the drum. The regulation is obtained by 90° around a pulley. This pulley acts on an automatic speed-changer at each new spiral of wire. This pulley is itself driven through a regulated friction and irreversible gears. No excessive tension, even on the fine wires.

Speed regulated from 60 to 200 yards/minute. Discharge of full drum by pneumatic jacks. Traverse adjustable in speed and width, positively linked to the rotation of the drum. Dimensions: 3′ x 3′ x 4′ Weight: 600 lbs. Supplied with 3 HP motor, electric equipment and counter.



POURTIER MACHINES

153, rue Gallieni, ROMAINVILLE (Seine) FRANCE

Elected Vice President of the International Nickel

John A. Marsh, Assistant Vice President and Manager of Operating Department of The International Nickel Company, Inc., has been elected Vice President of the company, according to an announcement by **Dr. John F. Thompson,** Chairman of the Board of Directors. Mr. Marsh is in general charge of all plant operations in the United States.

★ ★ ★

Mr. Marsh became associated with International Nickel as a laboratory assistant in its Huntington Works following his graduation from the University of Michigan in 1928. He was transferred to the Bayonne (New Jersey) Works of the company as Assistant Superintendent in January, 1936. In August of the same year he became General Superintendent of the Bayonne Works. Mr. Marsh was named General Superintendent of the Huntington Works in September, 1942, and in June, 1944, was promoted to Assistant General Manager.

★ ★ ★

In June, 1947, he was appointed Assistant to the Vice President in General Charge of All Plant Operations of the company in the United States and was transferred to the New York Office. He was named Manager of the Operating Department in January, 1952, and was elected an Assistant Vice President in May of the same year. Mr. Marsh succeeds the late Hugh J. Fraser.

Green Heads New Company

Howard I. Green, who resigned his position as Vice President and Director of Fidelity Machine Co., Philadelphia, following the sale of his interests a few months ago, has been named President of Fidelity-America Financial Corporation, private bankers.

★ ★ ★

The Company, with offices in the Fidelity-Philadelphia Trust Building, has recently been organized by a small group of prominent business, legal and financial men to do commercial financing in the Greater Philadelphia industrial area.

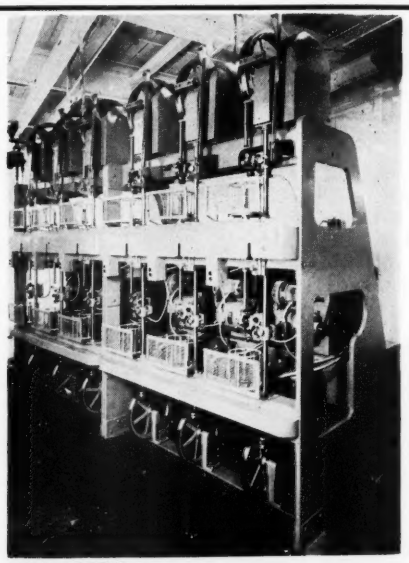
★ ★ ★

The new company will concentrate its service in the wire industry and will specialize in accounts receivable financing. The company will also handle financing for: government contracts, inventories, drop shipments, installment sales, machinery and equipment, mortgages, rediscounting, purchasing a business, and buying out partners.

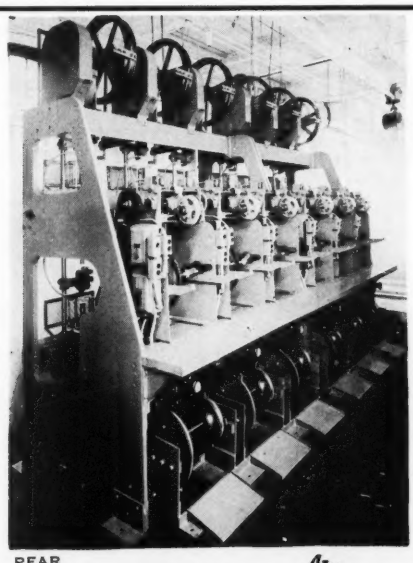
★ ★ ★

Mr. Green is president of three real estate companies and an investment group. He was a member of the syndicate which took over Fidelity Machine Co. early in 1946 and was largely responsible for developing the firm to its present position of leadership as a builder of precision machinery for the wire, textile and rubber industries.

★ ★ ★



FRONT VIEW



REAR

3D-6-MBB TAPING MACHINE #1107

Applies double cover to 6 lines of wire simultaneously. Nominal wire range #6 to #18 B & S gauges (.162" to .040" or 4.116 MM to 1.024 MM). Standard Capstans 24" in diameter. Supply wire let-offs and torque motor driven take-ups for 24" diameter reels are at rear of machine.

EST. 1855 AIMco INC. 1915

"American" AIM INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

A graduate of the Wharton School of Finance and Commerce, University of Pennsylvania, he was commanding officer of a PT Boat in the Pacific during World War II. He is a member of the Wire Association and the American Institute of Management. He served on the executive committee of the Knitting Machine Manufacturers Association.

H. K. Porter Co. Acquires A. Leschen & Sons Rope Co.

H. K. Porter Company, Inc., Pittsburgh, has acquired a controlling interest in **A. Leschen & Sons Rope Company,** St. Louis, Mo., **T. M. Evans,** president of Porter, stated.

★ ★ ★

The Leschen Company, established in 1857, is one of the country's oldest producers of wire rope. The company supplies wire rope for oil and gas drilling, elevators, marine uses, derricks and cranes, bridges, water well and blast hole drilling, rope slings, and many other purposes. Operations will continue as Leschen Wire Rope Company, a division of H. K. Porter Company, Inc., under the direction of **D. W. Vernon,** vice president and general manager. **A. A. Leschen,** former president, has expressed a desire to retire from active business.

★ ★ ★

Over the past few years Porter's policy of diversification has resulted in the company's entrance into the manufacture of rubber, steel, electrical equipment, forged steel fittings, hydraulic presses and equipment, and wire rope through the acquestion of Quaker Rubber Corporation, Connors Steel Division, Buffalo Steel Division, Delta-Star Electric Division, Watson-Stillman Company and, now, Leschen Wire Rope Company.

Appointments by Chain Belt

Chain Belt Company of Milwaukee announces the appointment of **Bernhard G. Schneider** to the newly created post of Assistant Chief Engineer, Conveyor Equipment Section of the company's Conveyor and Process Equipment Division.

★ ★ ★

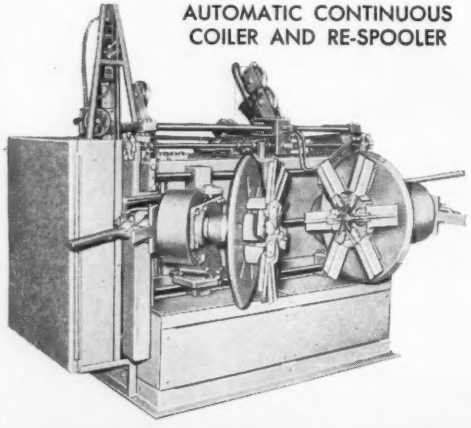
Mr. Schneider joined Chain Belt in 1926 as an engineering apprentice, and has since served in various technical and supervisory capacities in the Conveyor Equipment Section. In 1948, he was made Supervisor of Procedures, and in 1951 became Manager of Engineering Services.

★ ★ ★

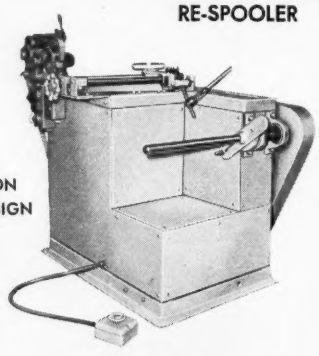
At the same time is was announced that Luther H. Bosnian has been made Vice President in charge of manufacturing facilities. He joined Chain Belt in 1919 and has been active in planning the company's present ordnance products, similar to those made in World War II.

DESIGNED FOR PRODUCTION EFFICIENCY

AUTOMATIC CONTINUOUS COILER AND RE-SPOOLER



RE-SPOOLER



- ELECTRIC BRAKE
- VARIABLE SPEED
- CONSTANT FOOTAGE
- PUSH BUTTON CONTROL
- AUTOMATIC ACCELERATION
- RIGHT OR LEFT HAND DESIGN
- SYNCHRONIZED ELECTRIC TRAVERSE

- FULLY AUTOMATIC
- CAPSTAN OPTIONAL
- AUTOMATIC CROSSOVER
- AUTOMATIC CUTTING
- SYNCHRONIZED ELECTRIC TRAVERSE
- AUTO-RESET PREDETERMINED COUNTER
- REMOVABLE SHAFTS FOR RE-SPOOLING
- ADJUSTABLE COLLAPSIBLE COILING HEADS

WIRE INSULATING MACHINERY, INC.

Division of Machinery Electrification, Inc.

98 UNION STREET WORCESTER 8, MASS.

Firth Sterling Appointments

Firth Sterling, Inc. has announced the appointment of **E. G. Moffat** as Manager, Carbide Sales Division, succeeding **C. R. Harmon**, who recently resigned.

★ ★ ★

In 1940 Mr. Moffat entered the service as a captain and rose to the rank of colonel. He served as works manager of the Watervliet Arsenal for three years. Prior to that he was in the engineering department of the General Electric Company for thirteen years. Mr. Moffat came with Firth Sterling in 1946 as Manager of the tool and die shop. He was made Manager of the Milford, Connecticut Plant in 1948. In 1951 he returned to Pittsburgh as Manager of the Mining Division, the position he has held until his present appointment. He is a graduate mechanical engineer from Pratt Institute.

★ ★ ★

Kenneth F. Julin has been made Assistant Manager, Carbide Sales Division. He has been with Firth Sterling since 1936, starting in the Steel Division Order Department. A year later he was transferred to the Carbide Shop Engineering Department, and then promoted to Assistant Chief Engineer of that Department. In 1950 he transferred to the Carbide Sales Division as Office Manager.

★ ★ ★

J. Martin Stokes has been appointed Assistant General Sales Manager-Administration. He came with Firth Sterling's Detroit Office in 1928, and in 1936 he became Office Manager. Mr. Stokes was transferred to the Pittsburgh Office in 1946 to assume the duties of Office Manager, Carbide Sales Division. In 1950 he was promoted to Assistant Manager of the Carbide Sales Division, a position he has held until his present promotion.

★ ★ ★

Fred Lord now becomes Chief Engineer, Mining Sales Division. He has been with Firth Sterling for the past twelve years, having spent eight years in the Engineering Department. He was formerly Assistant Superintendent of the Tool and Die Division at McKeesport, Design Engineer for mining tools at the Milford, Connecticut Plant, and most recently Assistant Chief Production Engineer.

Naugatuck Chemical Adds to Research Staff

Four new assignments in the research and development department of the **Naugatuck Chemical Division, United States Rubber Company,** were announced recently by **Dr. Earle S. Ebers,** director of research.

★ ★ ★

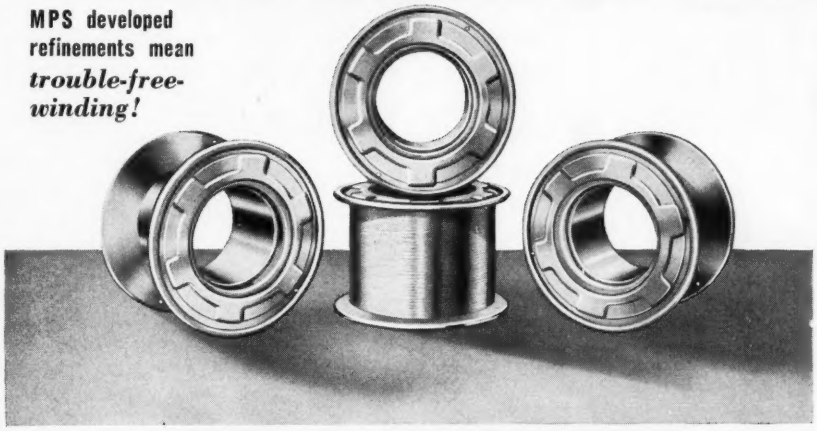
Dr. W. F. Tuley, was appointed group manager of product development and technical sales service; **Dr. L. H. Howland,** manager of synthetic rubber development; **Dr. P. M. Elliott,** manager of plastics development, and **F. L. Holbrook,** manager of rubber chemicals development.

Spool Headaches Eliminated

when MPS HEAVY DUTY NO-CREV SPOOLS

are used in the drawing of the finest wire at high speed

MPS developed refinements mean *trouble-free-winding!*



SIZES

* 6	x 3½ x 3½
6	x 6 x 3½
6½	x 3½ x 3½
6½	x 6 x 3½
8	x 6 x 4½
8	x 8½ x 4½

and others

* Illustrated

Mossberg PRESSED STEEL Corporation

18 WEST STREET ATTLEBORO, MASSACHUSETTS, U.S.A. Telephone Attleboro 1-0848

James Day (Machinery), Ltd., 28 Maddox Street, London, W. I. England #104

Spring Concern Elects Officers

Carlyle F. Barnes was elected president of the Associated Spring Corporation, Bristol, Conn., at the annual meeting of the Board of Directors. Mr. Barnes succeeds his father, **Fuller F. Barnes,** who was named chairman of the board. **Carlyle Barnes** was previously general manager of the corporation's Bristol divisions.

★ ★ ★

At the same meeting the board named **Walter E. Froehlich** as general manager of the Bristol Division. He was succeeded by **Charles F. Stofko** as factory manager.

Ellwood C. Howell

Ellwood C. Howell, advertising and sales promotion manager for the **Carboloy Department of General Electric Company** during the past 24 years, died of a heart attack on August 13th.

★ ★ ★

Mr. Howell was associated with New York advertising agencies prior to 1928 when he joined P. R. Mallory Co., Inc., as advertising manager. Two years later he was appointed advertising manager of Carboloy Co., Inc. now the Carboloy Department of General Electric Company.

He had held posts in numerous professional organizations, including the following: Secretary, vice president and director, National Industrial Advertisers Association. President, Industrial Marketers of Detroit. Chairman, sales promotion committee, The American Supply & Machinery Manufacturers' Association. He was also a member of the Detroit Adcraft Club and the Direct Mail Advertising Association.

To Sell Wafios Machines in U. S.

Kurt Orban Company, Inc., has been appointed exclusive American distributor for the complete line of German-made Wafios wire forming, wire netting, spring making and nail making machinery.

Heil Adds to Staff

Heil Process Equipment Corp., Cleveland, Ohio, manufacturers of chemical proof tanks, tank linings, heat exchange equipment, lead anodes, steam jet agitators and plastic exhaust hoods and duct work, has recently appointed **Wm. G. Gerstacker** as Chief Engineer. Mr. Gerstacker received his mechanical engineering degree from Case Institute of Technology and has had eighteen years experience as estimator, product manager and chief engineer with other process equipment manufacturers principally in the chemical plant equipment field.

★ ★ ★

Other recent additions to the Heil Staff include the appointment of **John M. Carpenter** as estimator in the lining and coating department and **Frank Babik** as estimator in the fabrication department. Mr. Carpenter received his Bachelor of Science Degree in Chemistry from the University of Arizona and has several years experience in industry. Mr. Babik has had approximately twenty years experience in fabrication and layout work for all types of steel and alloy fabrications.

★ ★ ★

These additions are in line with the current expansion program taking place at Heil Process Equipment Corp. and are intended to en-

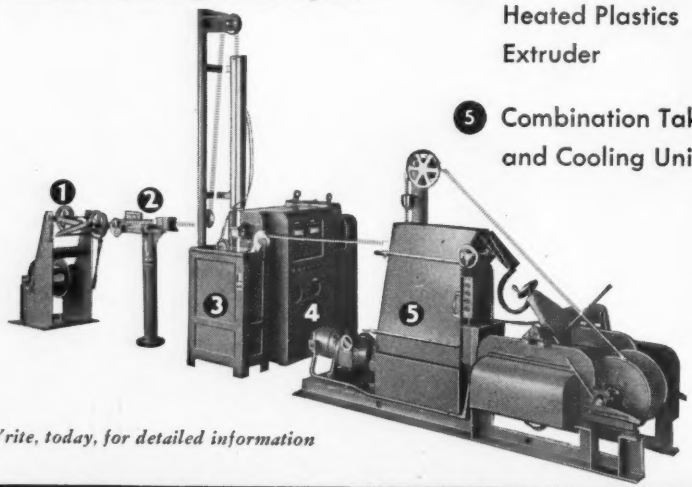
NRM

COMPLETE EQUIPMENT FOR COVERING WIRE WITH NYLON . . . . . .

Here's a "straight-line" production unit especially designed to give you faster, better covering of wire with Nylon. From the sturdy supply stand to the combination take-up and cooling unit, this NRM equipment is tailor made to give you the maximum output of accurately centered, smoothly covered wire at a minimum of cost and maintenance. A special metering type "torpedo" feed screw, a special Nylon crosshead, and extremely uniform heating are combined in a rugged 1½" electrically heated extruder to eliminate "pulsation" and to cover small gauge wire at high speeds and to close tolerances.

What's more, with a few simple changes this same equipment can be used with other wire covering plastics. The extruder, with built-in "Balanced Heat Control", need only be fitted with a different feed screw to handle a wide range of thermoplastics.

1. Supply Reel Stand
2. Wire Straightener
3. Vertical Wire Preheater and Cooling Tank
4. 1½" Electrically Heated Plastics Extruder
5. Combination Take-up and Cooling Unit



Write, today, for detailed information

2012

NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories: Akron 8, Ohio
East: 384 Getty Ave., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Cal.
Export: Omni Products Corp., 460 Fourth Ave., New York 16, N. Y.

Creative Engineering

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

A subsidiary of The Colorado Fuel and Iron Corporation

Empire State Building, world's tallest building.

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

PHOTO BY MC MANUS

A BOOK EVERY WIRE MAN SHOULD OWN AND READ...

"STEEL WIRE IN AMERICA"

written by Kenneth B. Lewis, as only he could write. This remarkable book treats of the various operations in wire making, giving the history and theories underlying each process, tracing the development of machinery, equipment and supplies used in the industry, and naming those individuals and companies involved in the evolution of our industry to its present stage of development. A highly readable treatise. You'll like it!

The book, sponsored by the Wire Association, is an unusual contribution to the literature on the art of making wire. It is not a handbook nor reference work, but is one that will bear much reading, re-reading and study. Any wire man will be better equipped for his work through a knowledge of the contents of Mr. Lewis' book.

The edition is limited and orders can be filled only as long as the small supply lasts.

THE PRICE: $15.00

Send your order today to assure yourself of a copy.

Book Dept., The Wire Association

Stamford **453 Main Street** **Conn.**

able this firm to give their customers additional service on their corrosion proof equipment requirements.

Sprague Electric Announces 4 Executive Appointments

Effective July 1, 1953, **Robert C. Sprague,** Chairman of the Board of the Sprague Electric Company, North Adams, Mass., electronic component manufacturer employing more than 6000 people in 10 plants located in 6 states, has announced that **Dr. Wilbur A. Lazier** will serve as Vice-President and Technical Director in Charge of the firm's research and engineering, and that **Neal W. Welch** becomes Vice President in Charge of Sales. **Dr. Preston Robinson,** former head of the research and engineering department and a member of the Sprague board of directors, will continue to serve the organization as a consulting engineer.

★ ★ ★

Mr. Sprague also announced the election of **Paul J. Crittenden** and **Hollis R. Wagstaff** as Assistant Treasurers of the company. Under guidance of Treasurer George B. Flood, Mr. Wagstaff will handle financial activities while Mr. Crittenden will continue to be responsible for credit and insurance matters.

Two Rome Cable Officers Promoted

Directors of the Rome Cable Corporation have created the new position of Executive Vice President of the company, and have appointed Mr. John H. Dyett to that position.

★ ★ ★

At the same time the directors named Gerard A. Weiss to the position of secretary, succeeding Mr. Dyett in that office.

★ ★ ★

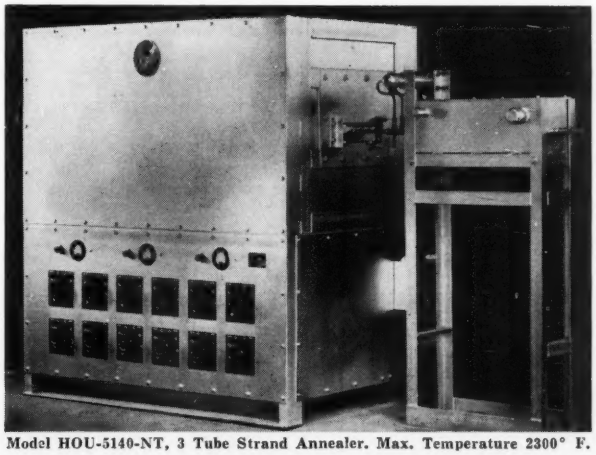
Mr. Dyett has been a director of the Rome Cable Corporation since 1936, and has served as vice president, secretary, and assistant treasurer. He was graduated from Yale University in 1934, and from the Harvard School of Business Administration in 1936. Mr. Dyett also is a trustee of the Central New York School for the Deaf, at Rome, a director of the Rome Trust Company, and a director of the Rome Chapter, American Red Cross.

★ ★ ★

Mr. Weiss joined the Rome Cable Corporation in 1950, and headed the firm's legal department. He also served as assistant secretary of the corporation. He formerly was an attorney in Tarrytown, N. Y.

Copperweld Promotes Kaplan

Copperweld Steel Company has named **I. M. J. Kaplan** vice president. He has been manager of sales—special products—of the wire and cable division at Glassport, Pa., and previously was connected with the steel division at Warren, Ohio.



Model HOU-5140-NT, 3 Tube Strand Annealer. Max. Temperature 2300° F.

At Bulova Watch

THIS HARPER STRAND ANNEALER UNIFORMLY ANNEALS HIGH ALLOY STAINLESS WIRE

This furnace plays an important part in heat treatment of delicate wire parts for precision instruments and fine watches at the Bulova Watch Company, Long Island, New York.

They are using this Harper Wire Annealing Furnace for annealing a high alloy stainless wire in the temperature range of 1750°F to 2300°F. at the rate of 8 feet per minute. This versatile furnace which at present is in use about 60 hours per week in research capacity will soon be used at full capacity due to increased production requirements.

The advantages of this Harper Furnace for Bulova are twofold: It provides exceptionally uniform temperature control throughout the entire heating zone. It gives them reliable troublefree operation.

We would like the opportunity to discuss your wire annealing problems with you. Let us send you information and recommendations on a Harper Strand Annealer that will give you reliable troublefree operation.

HARPER ELECTRIC FURNACE CORPORATION

Dept. 12, 39 River Street

Buffalo 2, New York

Wire Man Heads Branch of Controllers Institute

Gregory M. Layne, controller, Mid-States Steel & Wire Company, Crawfordsville, Ind., has been elected president of the Indianapolis Control of the Controllers Institute of America.

★ ★ ★

At the annual meeting of the organization's Cleveland Control, **Russell M. Braund,** comptroller, American Steel & Wire Div., U. S. Steel Co., was named a director.

Donald C. Starr New Chemsteel Secretary

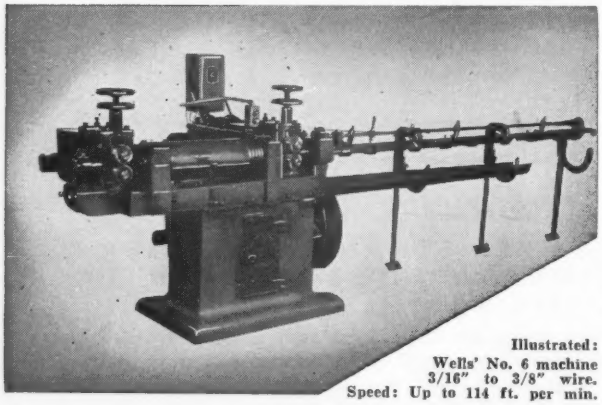
The appointment of Donald C. Starr, CPA, as secretary and comptroller of Chemsteel Construction Company, Inc., Pittsburgh acid-alkali-proof construction firm, has been announced by Charles E. Stone, Chemsteel president.

★ ★ ★

Mr. Starr, a graduate of Grove City College comes to Chemsteel from the Pittsburgh office of Price Waterhouse & Co., where he was a senior accountant. He is a member of the American Institute of Accountants, Pennsylvania Institute of Certified Public Accountants, and the Pittsburgh Junior Chamber of Commerce. During World War II, Mr. Starr served as a Commanding Officer in the United States Navy.

STRAIGHTEN and CUT SMALL WIRES

ON FAST, DEPENDABLE WELLS' AUTOMATIC ROTARY MACHINES



Illustrated: Wells' No. 6 machine 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

THIS MACHINE WILL CUT wire accurately and fast in any length from 7½" up to 25', but must be ordered for the maximum lengths to be cut.

The straightener flier runs in ball bearings. Has 2 H. P. motor arranged for direct drive. Drive gears are located inside of the base. Illustration shows the flier and drive open to show mechanism.

Furnished with 2 sets of hardened tool steel dies.

WELLS' machines are backed by 58 years of experience and of constant effort to improve their efficiency.

The result for you is a line of straightening and cutting machines that will handle the toughest jobs, day in, day out, year in, year out, with little or no servicing. Customers report uniformly high satisfaction with the operation of their WELLS equipment.

Built in a complete range of sizes for all wire gauges.

send for Catalog No. 50 covering the full line.

Frank L. Wells Company

KENOSHA • 5821 Fifth Avenue • WISCONSIN

Builders of Fine Wire Working Machinery

Anaconda Enlarging Great Falls Output of Aluminum Wire

H. Donn Keresey, president of **Anaconda Wire & Cable Company** has announced that his company is adding to its facilities for the manufacture of aluminum wires and cables at its plant at Great Falls, Mont.

★ ★ ★

The company has been producing aluminum wires and cables at Great Falls for more than two years and the expansion is being undertaken to keep pace with the requirements for these products by the public and private electrical utility industries.

★ ★ ★

Other Anaconda Wire plants now producing aluminum wires and cables are located at Hastings-on-Hudson, N. Y.; Marion, Ind.; Sycamore, Ill.; and Orange, Calif.

Promoted by Hooker

Richard W. Lyke has been promoted to assistant plant engineer for the Niagara plant of Hooker Electrochemical Company, it was announced recently. Mr. Lyke has been with Hooker since 1942. Before coming to Hooker, he was director of the science department of Livingston Manor Central High School from 1936 to 1942.

Carboloy Sales Appointments

Richard J. Benefiel has been appointed as salesman and assigned to the Pacific District Office of the Carboloy Department of General Electric Company in Huntington Park, California. He will cover the San Francisco and Northern California, Oregon and Washington areas. He joined the Carboloy Department in September, 1952. He has a Bachelor of Science degree from Michigan State College.

Grant A. Morrison is representing the company in the Department's midwestern district. He is now living at 3907 S. Madison, Tulsa. His organization's products include tungsten carbide, chrome carbides, Alnico magnets and other created metals.

★ ★ ★

He was graduated from the Lawrence Institute of Technology in 1951 and is a member of both the Society of Automotive Engineers and the American Society of Tool Engineers.

Pittsburgh Electric Wire Man Picked as "Leader of Tomorrow"

Robert C. Bennett, Jr., vice president and general sales manager of National Electric Products Corp. has been named one of Pittsburgh's 100 outstanding young men.

★ ★ ★

Mr. Bennett was selected as a "Leader of Tomorrow" by a committee of civic leaders who reviewed 1,300 nominations of young men from 21 to 39 years of age. The Chamber of Commerce of Pittsburgh and "Time" magazine sponsored the selection which was made on the mark the young men had already made in their own field, their civic contribution, and their future promise.

Firth Sterling Announces Sales Appointments

Firth Sterling, Inc. has appointed **James E. Gray** Assistant Manager of Carbide Sales. Mr. Gray joined Firth Sterling in 1929 in the Carbide Division at the McKeesport, Pa. Plant, when the Carbide Division was in its infancy. He has had twenty-four years experience in this division of the Company. In 1949 he became Office Manager of the Carbide Division, and was Supervisor of Carbide Sales in the Chicago District until his recent appointment. He attended Carnegie Institute of Technology where he majored in mechanical engineering.

★ ★ ★

At the same time the company announced the appointment of **Stuart A. Smith** as Ohio District Manager, replacing **Macon Jordan,** resigned. Mr. Smith joined Firth Sterling in 1949 as an Industrial Engineer. Following this he was a Wage and Salary Administrator, and then a salesman in the Ohio District from 1952 until his present appointment.

★ ★ ★

During World War II he served for two years in the U. S. Army Air Force. He is a graduate of Yale University, where he majored in Industrial Administration, and took graduate work at the University of Pittsburgh.

Fey Advanced by Nichols

M. J. Fey was recently promoted to Executive Engineer by the Nichols Wire & Aluminum Co., Davenport, Iowa. He had previously served in the capacity of Plant Engineer and Plant Superintendent.

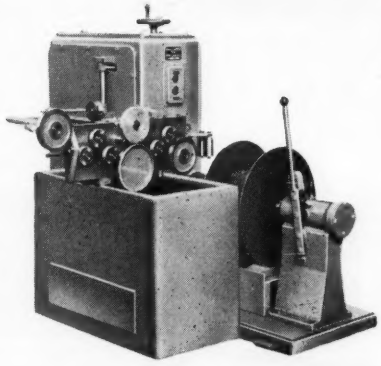
Promoted to Works Manager

Carl Solby has been promoted to works manager of the Eastern Brass & Copper Co., Inc., 1124 E. 180th St., New York 80, N. Y.

MAILLEFER S.A.

RENENS - LAUSANNE (SWITZERLAND)

MACHINERY FOR THE WIRE INDUSTRY



PRECISION SHAFTLESS

SPOOLER

for Reels up to 21" diameter, equipped with all desirable features:

- Built-in Motor
- Push-Button Control
- Fluid Drive for Smooth Starting
- Stepless Speed Control for Main Drive
- Stepless Speed Control for Accurate Traverse
- Shaftless Spring-loaded Fixing of Reels
- Automatic Stop Device when Reel is Full
- Automatic Stop Device at Defined Length
- Automatic Disengagement of Loading Track
- Wire Straightening Device on Traverse
- Pre-set Counter
- Pedal Operated Brake
- Throughout Ball-bearing Mounted

Enquiries to Maillefer S. A., Renens-Lausanne, Switzerland.

For the U.S.A. to J. L. Entwistle, Providence 7, R. I.

Franz Awarded Honorary Degree

A. F. Franz, President of The Colorado Fuel and Iron Corporation received an Honorary Degree of Doctor of Commercial Science at the 93rd Commencement of St. Bonaventure University, St. Bonaventure, New York, on June 7, 1953.

★ ★ ★

Recipient of one of five honorary doctorates which will be granted by the University, Mr. Franz heads the nation's ninth largest corporation in steel producing capacity.

★ ★ ★

Maryland Firm Elects Officers

Clarence E. Pink, formerly president, has been elected chairman of the board and chief executive officer of The Cambridge Wire Cloth Co., Cambridge, Md.; and **Edward N. Evans** has been elected president.

Henry Levitt

Henry Levitt, 68 years old, vice president and director of the Bohn Aluminum & Brass Corporation and general manager of the Michigan Smelting & Refining division, died suddenly in Detroit.

★ ★ ★

He was widely known in the non-ferrous metal industry, having celebrated 50 years of service with the company on February 5th of this year.

★ ★ ★

Mr. Levitt was a charter member of the Brass & Bronze Ingot Institute, a 32nd degree Mason, Ashlar Lodge and a member of Moslem Temple Shrine.

R. Leslie Beattie

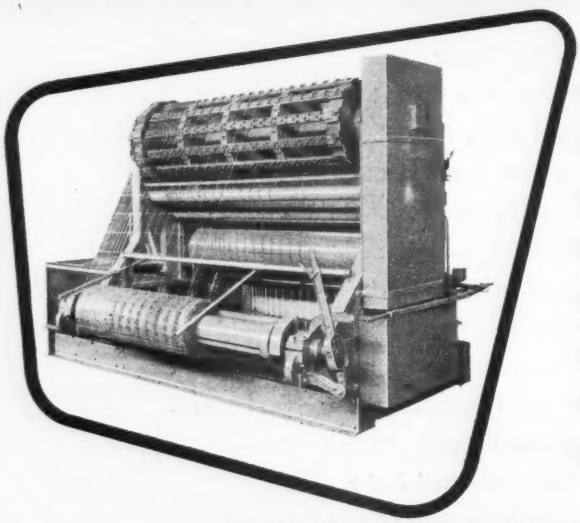
R. Leslie Beattie, Vice President and General Manager of Canadian Operations of the International Nickel, Company of Canada Limited, died suddenly in Toronto recently at the age of 62.

Mr. Beattie's position embraced the management of the company's mines, mill, smelters, refineries and auxiliary operations in Canada. Mr. Beattie was born on a farm near Caledonia, Ontario, and in November, 1911, joined the Canadian Copper Company, a predecessor of International Nickel.

★ ★ ★

In February, 1935, Mr. Beattie was appointed Assistant to the General Manager of International Nickel's Canadian Operations and Assistant Vice President in February, 1940. In December, 1942, he succeeded the late Donald MacAskill as Vice President and General Manager, and in 1943 he was elected a Director of the parent company. He became a Member of the Executive Committee of the Board and also a Director of the company's United States subsidiary, The International Nickel Company, Inc., in 1952.

Interlocking FENCE LOOMS



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- Straight Stay Wires
- Integrated — Space Saving
- Replaceable Main Bearings
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- Years of Low Cost Production

Write for Detailed Information — Without Obligation

Interlocking Fence Co., Box M8, Morton, Ill.

Specialists In Fence Looms

A Review of Recent Wire Patents

No. 2,643,402, MACHINE FOR FORMING AND THREADING BOLTS, SCREWS AND THE LIKE, patented June 30, 1953 by Arthur H. Billow, Waynesboro, Pa., assignor to Landis Machine Company, Waynesboro, Pa., a corporation of Pennsylvania.

More specifically the invention resides in a work-forming mechanism for a screw thread forming machine.

★ ★ ★

No. 2,643,688, DEVICE FOR CORRUGATING WIRE, patented June 30, 1953 by David E. Crooker, Ontonagon, Mich., assignor of one-half to Lloyd L. Felker, Marshfield, Wis.

Associated with the corrugating gears of this machine are backing rollers.

★ ★ ★

No. 2,643,698, MACHINE FOR FORMING CONTINUOUS WIRE COILS, patented June 30, 1953, by David E. Crooker, Ontonagon, Mich., assignor of one-half to Lloyd L. Felker, Marshfield, Wis.

★ ★ ★

Wire is wound upon a mandrel with which is associated a number of rollers which engage not only that portion of the coil upon the mandrel but a portion extending beyond the latter to provide a gripping action on the last-named portion.

★ ★ ★

No. 2,643,705, WIRE SPRING STRUCTURE, patented June 30, 1953 by William H. Neely, Cleveland, Ohio, assignor to The Universal Wire Spring Company, Cleveland, Ohio, a corporation of Ohio.

Zig-zag shaped wire strips are provided in combination with specially-formed V-shaped integrally formed wire members the strips for spacing the same.

★ ★ ★

No. 2,643,758, APPARATUS FOR WIRE SPRINGS, patented June 30, 1953 by Svend G. Blumensaadt, Beachwood Village, Ohio, assignor to The Universal Wire Spring Company, Cleveland, Ohio, a corporation of Ohio.

This machine is for forming wire springs from sinuously corrugated wire strips having left and right-handed open loops.

★ ★ ★

No. 2,643,959, PROCESS FOR THE PROTECTIVE TREATMENT OF IRON, patented June 30, 1953 by Johannes Fischer, Berlin-Siemensstadt, Germany, assignor to Manufacturers Chemical Corporation, New York, N. Y., a corporation of New York.

A process for the protective treatment of iron is disclosed comprising causing iron to react at 700° to 1000° C. with an anhydrous gaseous medium consisting of hydrogen and aluminum chloride and obtained by the reaction, at 300° to 600°C., of anhydrous HCl gas and a mixture of aluminum, aluminum oxide, and coal, until a coating of aluminum is deposited on the surface of the iron treated.

★ ★ ★

No. 2,644,069, APPARATUS FOR CUTTING WIRE AND BUTT WELDING THE SAME TO AN ELEMENT, patented June 30, 1953 by Albert F. Pityo, Clifton, N. J.

There are fifteen claims to this apparatus, in which the distance between the welding electrode and a wire severing device is fixed so that the length of that portion of the wire extending forwardly beyond the electrode will remain constant when the wire is severed.

★ ★ ★

EXPERIENCE IN COPPER WIRE DRAWING.

W. Hodgkins. Ind Diamond Rev 1953 Vol 13 (149) p 92 (Apr)

Although heavy die wear observed on machine using draft of 26%, increasing to 30% for last 2 or 3 dies, satisfactory die life obtained on machine using 23%

J.G. KAYSER

MASCHINENFABRIK · NÜRNBERG

Machines for making Steel Screws:

Double Stroke Heading Presses

Head Trimming and Shank Reducing Machines

Machines for Rounding off the End

Screw-Head Slotting Machines

Thread Rolling Machines

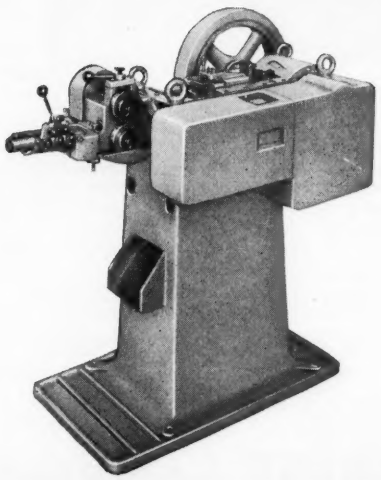
High Efficiency High Speed Wire Nail Presses

Roofing Nail Machines

Machines for making Shoe Tacks:

Cut Tack Machines

Wire Tack Machines



Double Stroke Press Model TRPH (Minus) for the manufacture of contact points and small rivets from precious metals up to 1½ mm dia. of wire (iron 1 mm).

Machines for making Wood Screws:

Single Stroke and Double Stroke Presses

Head Turning and Slotting Machines

Thread Cutting Machines

Thread Milling Machines

Wire Forming Machines

Staple Making Machines

High Speed Barbed Wire Machines

Wire Straightening and Cutting Machines

draft. Poundage of wire drawn per die on first machine 2 to 3 x higher; by introducing positive lubricating system, figures could be improved. Other wire drawing firms do not obtain similar poundage from diamond and sintered carbide dies. Most probably die shape, erratic drafting and inefficient copper cleaning methods contributed to observed differences.

★ ★ ★

No. 2,644,174, SPRING MATTRESS CONSTRUCTION, patented July 7, 1953 by Eugene Joseph Hood, Carthage, Mo., assignor to Frank B. Williams and Harold E. Williams, both of Carthage, Mo.

The helical wire springs are joined by helical binder wire coils and a padding support of paralleling support wires is provided, extending transversely of the binder coils.

★ ★ ★

No. 2,644,775, METHOD OF BRIGHT ANNEALING AND CLEANING, patented July 7, 1953 by Harry R. Spence, Lewiston, N. Y., assignor to Hooker Electrochemical Company, Niagara Falls, N. Y., a corporation of New York.

★ ★ ★

The method comprises subjecting the metal to the action of the fumes of a mixture of sodium hydroxide and sodium fluoride, until a protective coating of the composition is deposited on the metallic surface, annealing the metal, and subsequently removing the protective coating by quenching the article in an aqueous medium.

★ ★ ★

No. 2,644,947, BRASSIERE, patented July 14, 1953 by Herbert L. Schwartz, New York, N. Y., assignor to S&S Industries, Bronx, N. Y., a copartnership composed of Herbert L. Schwartz, Marcus Schwartz, and Elsie Schwartz.

★ ★ ★

More specifically, the invention is in a form preserver, of wire, for a brassiere.

★ ★ ★

No. 2,645,268, WIRE BENDING FIXTURE, patented July 14, 1953 by Svend G. Blumensaadt, Beachwood Village, Ohio, assignor to The Universal Wire Spring Company, Cleveland, Ohio, a corporation of Ohio.

★ ★ ★

This fixture is for bending the laterally extending straight end portions of sinuously corrugated wire springs into attachment members. It is a division of application Serial No. 771,592 filed Sept. 2, 1947.

★ ★ ★

No. 2,645,429, WINDING MACHINE, patented July 14, 1953 by Benjamin B. Scott, George F. Greene, and Frank E. Valentine, Schenectady, N. Y., assignors to General Electric Company, a corporation of New York.

★ ★ ★

Corrections are introduced during the winding of wire so that the turns will be exactly positioned.

★ ★ ★

No. 2,645,590, MANUFACTURE OF AIR SPACED ELECTRIC CABLES, patented July 14, 1953 by Raymond Charles Mildner, Shirley, Oxhey, and Clive Edward Christopher Lovelace, Blackheath, London, England, assignors to Telegraph Construction & Maintenance Company Limited, London, England, a company of Great Britain.

★ ★ ★

In the manufacture of an electric conductor structure having an air space insulation the method comprises simultaneously moving the conductor and a tube of dielectric material thereon in the form of a helix, and during moving stretching the turns of the helix to the required pitch to provide a helical membrane about the conductor.

★ ★ ★

No. 2,646,085, MACHINE FOR FORMING WIRE GARMENT HANGERS, patented July 21, 1953 by Olive R. Brekle, Birmingham, Ala., assignor to M and B Metal Products Company, Birmingham, Ala., a partnership composed of Milton M. Magnus and Oliver R. Brekle.

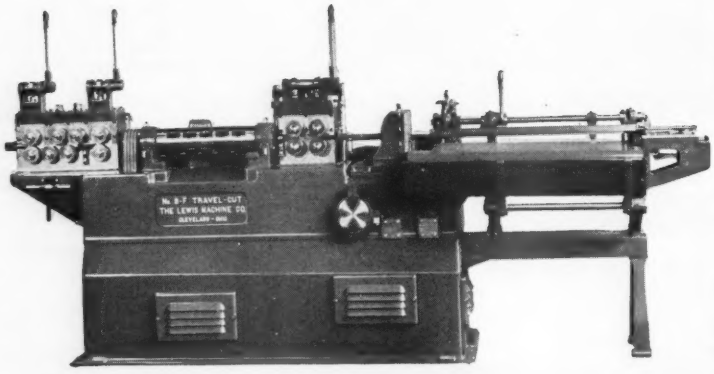
The wire lengths, overhanging a stationary support at their ends are engaged by pin carrying arms to bend the lengths into the desired form.

★ ★ ★

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS **TRAVEL-CUT**



22 Models to handle from .012" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL-CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

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CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3005 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 11 738 Dundas St., Toronto, Ont., Canada

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

No. 2,646,086, MACHINE FOR CRIMPING THE BOTTOM COILS OF COIL SPRINGS, patented July 21, 1953 by Charles C. Smith, Adrian, Mich., assignor to Stubnitz-Greene Spring Corporation, Adrian, Mich., a corporation of Michigan.

There are 10 claims to this crimping machine, which also includes a pick-up device for the spring to be crimped.

★ ★ ★

No. 2,646,108, SPRING, patented July 21, 1953 by Harry H. Norman, Los Angeles, Calif., assignor to Zig Zag Spring Company, Los Angeles, Calif., a partnership.

This spring comprises a span of laterally corrugated spring wire longitudinally arched, convolutions of which inwardly of the supported ends of the span as they approach the ends of the span are vertically corrugated with a number of up and down progressively deeper corrugations.

★ ★ ★

No. 2,646,186, BASKET STRUCTURE WITH STACKING HANDLES, patented July 21, 1953 by George L. Russell, Fair Haven, Mich.

The basket is of large size and, including the handles, constructed of wire.

★ ★ ★

No. 2,646,277, APPARATUS FOR DELIVERING WELDED WIRE FABRIC, patented July 21, 1953 by William S. Southwick, East Lynn, Mass., assignor to Thomson Electric Welder Company, Lynn, Mass., a corporation of Massachusetts.

More specifically, the apparatus is for controlling the tension and speed of welded wire fabric drawn from a supply.

★ ★ ★

No. 2,646,952, NURSERY BOTTLE HOLDER, patented July 28, 1953 by James H. Chambers, Fresno, Calif.

The holder is collapsible and is constructed wholly of a single length of ductile wire bent to shape.

★ ★ ★

No. 2,645,702, WIRE CLOTH TUBE FORMING MACHINE, patented July 14, 1953 by James J. Harmon, Jr., Clayton, Mo., assignor to Ludlow-Saylor Wire Co., St. Louis, Mo., a corporation of Missouri.

Wire cloth is received by the machine which forms it into a tube and seam-welds the tube, then severing it from the roll of cloth.

U. S. Rubber Man Given Degree

Clarence W. Higbee, manager of United States Rubber Company's wire and cable department, mechanical goods division, was given the honorary degree of civil engineer by Rensselaer Polytechnic Institute at commencement exercises in Troy, New York.

★ ★ ★

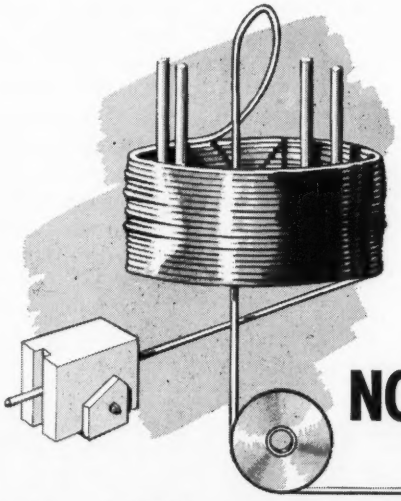
Mr. Higbee, who was elected president of N.E.M.A. in 1950, has been with United States Rubber since his release from the Army in 1919. Since then, when Mr. Higbee joined U. S. Rubber as a sales clerk, he has progressed through positions of increasing responsibilities and has received various forms of recognition from business and professional colleagues for "his able application of engineering principles and executive ability".

★ ★ ★

The wire and cable department which he heads also produces battery separators and wiring devices.

Furnished 75% of Free World's Nickel

In 1952, for the third successive year, **International Nickel** maintained production at capacity and supplied more than 75 per cent of the nickel used by the free world.



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DRAWING COMPOUNDS

give 100% longer top-quality performance

AT NO HIGHER COST **for wet drawing of non-ferrous wire, rods, tubes**

You'll find that Nopco DURPONS not only provide optimum lubrication, but retain their initial degree of performance for *twice as long* as conventional wire-drawing compounds. Yet they cost you no more.

To achieve the greatest possible die life, a buffer has been incorporated in all DURPON compounds to maintain the pH level, thus preventing breakdown of the emulsion, making the bath last longer.

To keep the bath clean and prevent contamination of effective drawing ingredients by holding flotation of metal particles to a minimum, a sequestering agent has also been incorporated. This ties up metal ions so that they cannot react with soap to form insoluble metallic soaps.

It will pay you to investigate all of the advantages of these superior, high-performance wire-drawing compounds now.

DURPON — for intermediate gauge wire
DURPON L — for heavy wire, rods and tubes
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Mail coupon for technical bulletin and free trial sample.

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Gentlemen: Please send me a copy of your technical bulletin and a free trial sample of: DURPON ___ DURPON L ___ DURPON FW ___.

NAME_____ TITLE_____

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CITY_____ ZONE___ STATE_____

Old Company Changes Name

Ludlow-Saylor Wire Cloth Company is the new name to use in addressing the St. Louis firm known since 1875 as The Ludlow-Saylor Wire Company. Only the name is changed; the product is still the same—Industrial Wire Cloth of the highest possible quality, woven on looms perfected and built by Ludlow-Saylor's own engineers.

★ ★ ★

Established in 1856 as Ludlow's Wire Works, the business was consolidated in 1870 with O. P. Saylor & Co. under the name of Ludlow, Saylor & Co. The original enterprise was one of the first in America to specialize in the manufacture of Industrial Wire Cloth. The meshes known as "mining screens" were in great demand throughout the gold, silver and copper mining camps of the West, and the carefully woven Ludlow-Saylor cloths, at first of iron wire, later of steel, were preferred for their quality over any of the wire cloths previously imported from European sources.

★ ★ ★

The ensuing century has developed highly specialized wire cloths which have become essential to almost every division of industry. All of the various types of stainless steel have been made available in the form of wire cloth for industries where corrosion offers specially difficult problems. Wire cloth of pure nickel and Monel has overcome long-standing difficulties for industries plagued with product contamination or discoloration. Wire cloths of aluminum, brass, bronze, copper, tinned copper, tinned steel and galvanized steel have been developed to give satisfactory performances in countless industrial operations where corrosion problems are more or less severe. Rugged abrasion-resistant Super-Loy woven wire screens are in world-wide demand for sizing and sifting extremely abrasive materials such as crushed coke, crushed ores, crushed stone, gravel and sand.

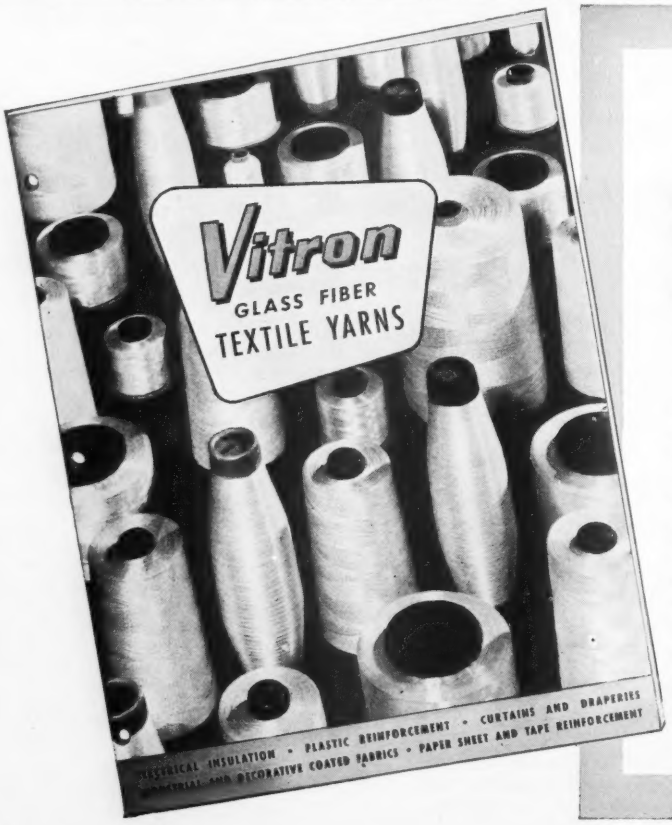
No changes are planned in the operation of the business, except to expand and improve production facilities. The officers and directors remain the same.

Adds Non-Returnable Reel Heads to Line

William McCaskie, Inc., Forge Road Westport, Mass., manufacturers of returnable reels of wood construction for wire and electric conductors, has installed new equipment for the construction of nailed-up non-returnable reel heads in diameters of from 12 to 58 inches. The line of reels made by McCaskie heretofore have been made of the finest woods and plywood, some types metal bound, and all of glued and pegged construction, employing no nails.

★ ★ ★

Because of the demand for a less expensive non-returnable reel, these new reel heads are now being made to a design that will be sufficiently strong and serviceable for the purposes to which they will be put, yet cheap enough in cost so that they can be discarded after use.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DECORATIVE COATED FABRICS • PAPER SHEET AND TAPE REINFORCEMENT

Q. What process means *uniformity* in glass yarns and fabrics for superior quality glass-plastics products?

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This 8-page booklet will give you the "what" and the "why" on VITRON Glass Fiber Yarn from raw glass batch to finished package. The new glass fiber nomenclature, property tables, synthetic fiber comparison charts are all here too.

Write now for your copy. Glass Fibers Inc., Dept. IM-35, 1810 Madison Avenue, Toledo 2, Ohio.

Molten Salts for the Wire Industry

(*Continued from page* 893)

rod pieces (approx. 1% C) was added to 5-lbs. of a strongly decarburizing bath at 1450°F. After 15 minutes the bath was flushed with N_2 and gas samples were taken. Their composition was determined in an Orsat apparatus:

Vol. -%	CO	CO_2	H_2		Ratio $(CO/2CO_2)/H_2$
Sample #1	1.9	3.3	7.3	balance N_2	1.16
Sample #2	1.25	2.6	7.7		0.84

These data indicate that a reaction took place between carbon in the steel and water in the melt to form H_2 and a mixture of CO and CO_2:

$$C \text{ (in Austenite)} / H_2O \text{ (in melt)} = H_2/CO$$
$$C \text{ (in Austenite)} / 2H_2O \text{ (in melt)} = 2H_2/CO_2$$

★ ★ ★

It was noted in a similar experiment that the evolution of CO, CO_2 and H_2 extracted a considerable amount of the decarburizing water vapor which appeared to have been retained in the molten KCl-NaCl. The water evolution, measured by dew point analysis, was still in progress three hours after the introduction into the molten salt.

Summary

Analysis of the gaseous reaction products of a decarburization reaction in KCl-NaCl melts indicate that decarburization is caused by reaction of the carbon in the steel with water contained in the melt. It has also been shown that molten salts maintain a considerable water vapor pressure which increases with increasing decarburizing tendency of the bath.

★ ★ ★

It appears that water vapor is dissolved in salt baths at temperatures between 1300 and 1800°F. Apparently it can be extracted by other gases such as N_2 and CO. In the case of decarburizing baths, decarburization action decreases during such "stripping" treatment.

★ ★ ★

Cyanide or organic rectifiers which are added to commercial heat treating salts to prevent decarburization appear to act similarly. Apparently they decompose whereby the bath is flushed by the gaseous decomposition products. Certain rectifiers may also act by neutralizing harmful carbonates or by producing carburizing compounds.

Write for full details and ask for a demonstration.

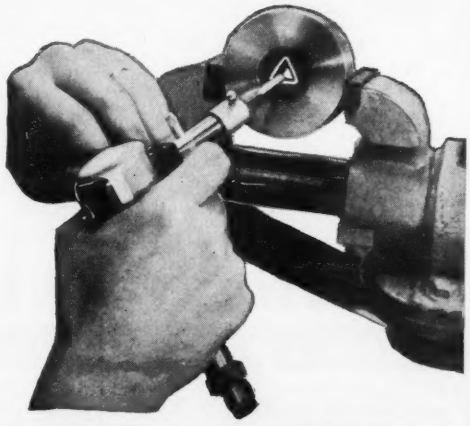
Di-Profiler TRADEMARK *New* **COMPLETE DIE FILING TOOL**

This tool is light, portable and fast-cutting. Comes equipped with a set of diamond files and hones and can cut, lap and polish at unprecedented speeds—the tools are operated at 28,000 strokes per minute.

Good for round dies, but especially efficient and fast on shaped dies, doing a job that normally takes hours, in a matter of minutes.

This remarkable new tool, of which hundreds are in daily use, is inexpensive to buy, easy to use and produces excellent results at great savings of time and money.

Has hundreds of other uses and will be found an invaluable aid in mill maintenance repair shop work. A 50 page hand book of applications goes with each NORD DI-PROFILER.

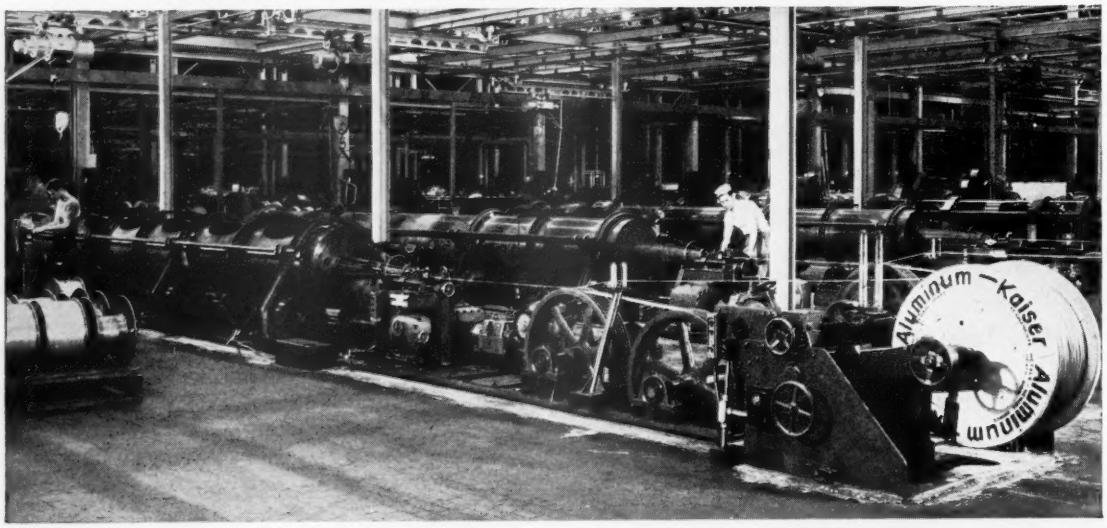


Nord International Corp.

P.O. BOX 44W, DENVILLE, N. J.

NEW 22" SPOOL 750 RPM TUBULAR STRANDER

HYDRAULIC LIFT REEL STAND — INFINITELY VARIABLE TRAVERSE AIR CONTROLLED
DOUBLE DRUM HAUL-OFF WITH LINK BELT P.I.V. — AIR OPERATED BRAKING SYSTEM



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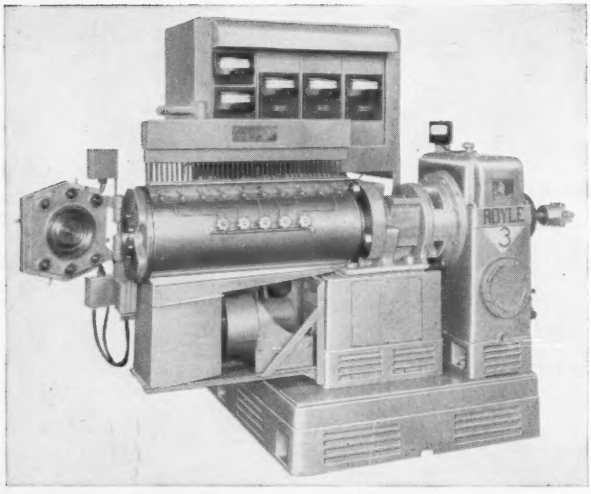
FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

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It appears that NaOH and Na_2CO_3 themselves are not the decarburizing agents. When they are added to a KCl-NaCl melt severe decarburizing action is only observed about half an hour after addition to the melt according to the observations reported above. It is possible that alkaline baths dissolve more of the detrimental water vapor.

★ ★ ★

Speculations as to the general problem of water vapor pressure over molten salts would be premature without further experimental evidence.[11] The results are presented as a preliminary communication in the expectation that they may stimulate further work elsewhere because of the possible importance of dissolved water in molten salts used for heat treating metals and for other industrial applications.

(11) Compare also: H. von Wartenberg, Z. Elektrochem, *55*, 445 (1951); "Absorption of Water by Molten Oxides."

C. F. & I. Installs New Equipment

New annealing equipment has been installed at The Colorado Fuel and Iron Corporation's fully-integrated steel mill at Pueblo, Colorado. This equipment will double the plant's capacity for the production of pot annealed wire, according to A. F. Franz, president of the corporation.

★ ★ ★

New annealers will supply wire to additional coiling equipment for final processing into standard 48-pound and 100-pound coils of automatic baling machine wire. In cooperation with equipment manufacturers and the American Society of Agricultural Engineers, baling wire coils have been standardized at 14½ gage with coil lengths of 3,150 and 6,500 feet.

★ ★ ★

This standardization has made it possible to use modern packaging techniques, boxing the baling wire for shipment in standard-size, easy-to-handle cardboard cartons. The overall increase in production that has been accomplished by the new equipment and improved methods will result in speeded-up delivery of this product to widespread farm markets.

★ ★ ★

Addition of the new annealers and coilers at the Pueblo steel mill is part of a long-range program of expansion, modernization, and product diversification being under taken by The Colorado Fuel and Iron Corporation, Mr. Franz said. With 12 plants in seven states, Colorado Fuel and Iron produces a wide range of products for most of the nation's principal steel-consuming industries.

Stainless Steel Output at Peak

Production of stainless and heat-resistant steels in the United States reached a new all-time peak level in 1953 at 594,203 net tons, the American Iron & Steel Institute reported yesterday.

★ ★ ★

This was an increase of 104,958 tons over the second half of 1952, when the previous record was made, and 181,617 tons higher than in the first half last year.

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- Wire Guide Units
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- Wire Pre-Heater
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- Labelling Machines
- Pneumatic Equipment and Controls
- Special Machinery for the Wire Industry
- Hydraulic Equipment and Controls
- Hi-Pot Test Sets
- Cable Handling Equipment for Warehouse Use

See Page 874 for News of JLE Automatic Dual Take-Up, Class T

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Proposed New Scale for Expressing the Stiffness of Round and Flattened Wire

(*Continued from page 876*)

or machine setting. These values are:

For round wires: $S_w = \frac{\sqrt[3]{\text{torque}}}{\sqrt[3]{\text{bend}}} \Big/ \text{diameter}$

For flattened wires (ribbons): $S_r = \sqrt{\frac{\text{torque}}{\text{width} \times \sqrt[3]{\text{bend}}}} \Big/ \text{thickness}$

The possibility of determining factors to convert these two terms into a common hardness number (such as Rockwell-B) was discussed, but preliminary results have shown that either the relationship is non-linear or that discrepancies existed in the test methods. Further tests are being conducted on this phase.

The most important use for these stiffness terms will be their use in quality control and specifications.

1. **Walston Chubb, Jr., "An Investigation of the Weavability of Wire with Observations on the Defects of Wire and Wire Cloth,"** *Wire and Wire Products, 25,* **1950 (in 4 parts) pp. 125, 222, 300, 407.**
2. **Walston Chubb, Jr., and D. S. Eppelsheimer, "A Mechanical Test to Measure the Workability of Wire,"** *Wire and Wire Products, 24,* **1949, p. 491.**

TABLE IV

Effect of Work Hardening on the Stiffness of Wires of Three Chrome-Nickel Alloys

Alloy	Wire Dia. (in.)	Percent Reduct.	Torque (gm-cm)	Degrees of Bend	S_w
1	.0399	0	1200	35	179
	.0362	18	1400	29	213
	.0324	34	1200	36	220
	.0285	49	800	31.5	222
2	.0395	0	1000	27	176
	.0362	14	1300	27	209
	.0324	33	1100	35	215
	.0285	48	800	36	219
3	.0396	0	1000	37	169
	.0362	16	1300	35	203
	.0324	33	1000	30	211
	.0285	48	700	28	215

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453 Main St., Stamford, Conn.

Continuous Gaging for Machine Control

(*Continued from page* 878)

delay. The effect of the time delay is to cause the thyratrons to overlook the local bumps and variations in the wire. If an oversize or undersize condition occurs and lasts for a period greater than that for which the time delay is set, the thyratrons fires and operates its respective relay.

★ ★ ★

When this occurs, the gage has established that the wire is oversize or undersize. This information is transmitted to the machine control unit. The machine control panel operates a suitable heavy duty relay for a short period of time. This may be a tenth of a second, quarter of a second up to a maximum of about 1 second. The heavy duty relay is in turn tied in to the capstan speed adjusting mechanism on the extruder.

★ ★ ★

The effect then, up to this point is that the gage has overlooked the local bumps, and when it does see a beyond tolerance condition, it jogs the wire speed adjuster in much the same manner the operator would do when he touches his speed adjusting button. Usually the duration of this jog is set so that it produces an effective change of about .0005″ in the actual wire size for each individual connection.

★ ★ ★

Because this type of gage actually touches the wire, it is usually positioned immediately after the water hardening bath. This is usually some twenty or so feet from the extruder. After the gage makes a correction, it takes some few seconds depending on the wire speed for new size wire to reach the gage. So that the gage will wait for this new wire before taking a second measurement, a time delay is provided. After the gage makes its correction it shuts itself off for a given interval of time. This interval depends on the gage distance from the extruder and the speed of the wire. After this interval has elapsed the gage turns

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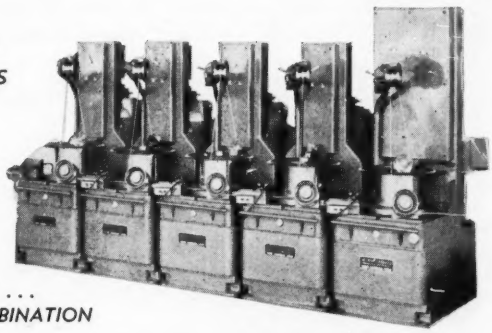

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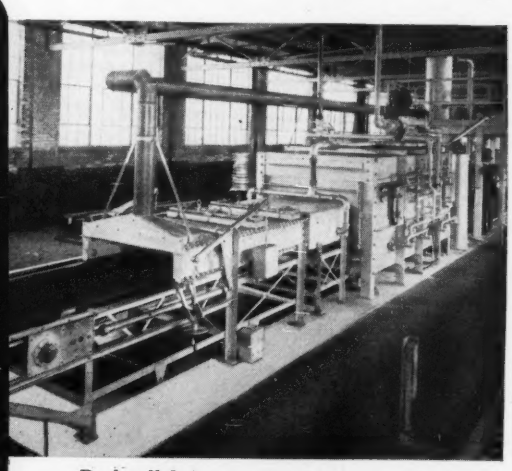

Rockwell belt conveyor furnace, gas-fired, for bright annealing wire on spools or in coils in a controlled, protective atmosphere in heating and cooling zones. Other Rockwell furnaces for wire mills include parallel muffle tube, pit, hood, pan and other types. Write for Bulletin 432.

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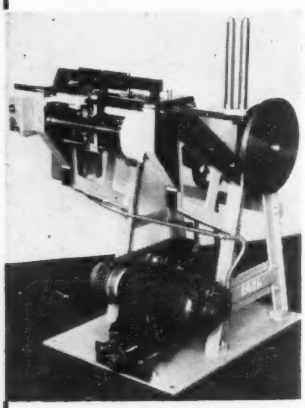

Positive screw reversing mechanism and change gears offer a wide range of distances and speeds for traverse rates to accommodate various sizes of wire or other materials.

Large adjustable slip clutch provides constant speed of winding to allow for build-up and to produce uniformity. This makes this machine an excellent addition to your drawing or finishing machine producing your product at a point where it is to be packaged.

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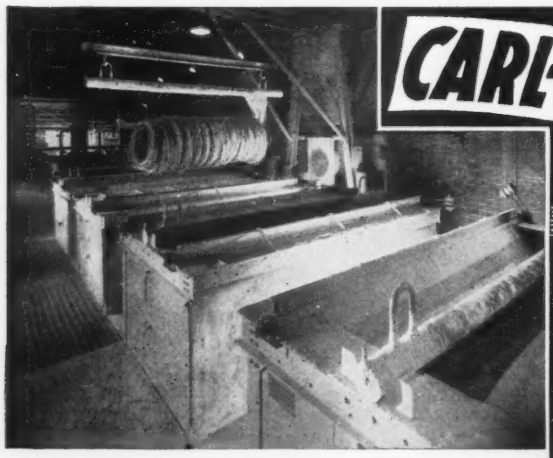

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itself on again and observes the wire size once more. If the wire is still beyond tolerance, another correction is made. This process continues until the wire is brought within tolerance. When this occurs, the gage signals the operator again by means of lights telling him that process is under control and that the wire is within limits.

★ ★ ★

Actual tests run with the automatic gage control show that the usual hand-miking every 15 to 30 minutes is completely inadequate. Wire size changes almost continually, tending to drift toward the high or low limit. Frequent corrections on the average of once every several minutes are required to hold the wire within close limits. It is not humanly possible for an operator to make these frequent adjustments, but the gage can if necessary make adjustments every minute or so. In addition, gage limits are usually set well within the required wire tolerance. Thus, in effect, the gage anticipates oversize or undersize wire. On an extruder running, for example, #18 solid wire, the gage can hold total wire variations within ±.0005". The nominal size setting can then be brought nearer to the low limit than is possible with manual adjustments and a considerable saving results.

★ ★ ★

Installation of such a machine control unit is simple. It requires only that the extruder be provided with push buttons for adjusting capstan speed and consequently wire size. The gage is then wired in as though it were an extra automatic push button station.

Inco Nickel Deliveries Increased in 1952

In the last three years, in response to an unprecedented demand, **International Nickel** delivered a total of nearly 100,000,000 pounds more nickel than the amount the company delivered over any prior three-year period, exclusive of World War II. In 1952, Inco's deliveries of nickel in all forms totaled 249,000,000 pounds, an increase of more than 5,000,000 pounds over 1951.

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Overhead Conveyor System Mechanizes Processing in Wire Plant

(*Continued from page 880*)

It was challenging because it involved a group of operations which had never before been mechanized. It demanded new thinking—a new conception—and fortunately, the engineers at Alloy Metal supplied the most wholehearted and open-minded cooperation.

★ ★ ★

Engineers at Specialty Engineering Company have designed, made and installed facilities and integrated handling systems for many industries. In deciding on an overhead type conveyor for Alloy Metal, important engineering factors were considered.

★ ★ ★

The overhead chain conveyor is a combination of mechanical motions plus such electrical devices as are needed. It is subject to automatic, semi-automatic or manual control which can be applied to any machine or process operation. Remote controls, safety stops, electronic controls, interlocks, speed variation controls, all may be easily applied. Conveyors of this type are among the most economical in terms of pound-feet or ton-miles of materials moved for a given expenditure of horsepower.

★ ★ ★

Selecting this type of conveyor to automate a group of operations at the Alloy plant was one thing. Adapting it to perform in the manner required was another.

★ ★ ★

All operations had to be separately studied and separately worked out step by step, to synchronize into one unified cycle, so that each round of the cycle would mean completion of all the processes involved.

★ ★ ★

The conveying system at Alloy Metal is a convincing example of the tremendous advantages now available to progressive manufacturers in automating their production.

New

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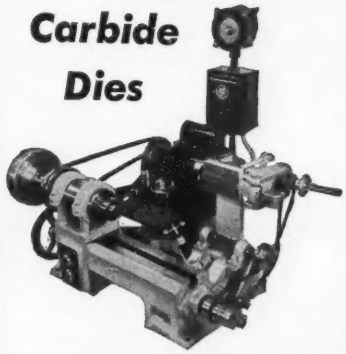
SAVE up to 50%* on Labor Costs for Finishing Tungsten Carbide Dies



* Statement from actual user by one of America's largest Tungsten Carbide Die Makers.

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Electric Furnaces for the Wire Industry

(*Continued from page* 887)

advantage of danger of breakage of the troughs, with ensuing production delay and loss of metal and loss of salt.

★ ★ ★

In judging the economy of an electrical furnace installation for the treatment of steel wire, the desired quality of the finished product is of predominant importance. The combination of acid or soda bath in pickling, forced-air circulation in drying, continuous annealing and inside heating of the lead bath, all electrically accomplished, results in the greatest improvement in quality and at the least of expense.

★ ★ ★

Logically determined, the use of electrical furnaces through their exact temperature control indicates a high degree of efficiency in the heat treatment of wire.

Standardized Carbide Fastener Nib Dimensions Meet Most Cold Heading Needs

(*Continued from page* 886)

parts in which these heading dies and hammers have not been successfully applied, popularity of carbides is currently growing fastest in the production of such bolt and screw sizes as No. 4, 5, 8, 10 and ¼ inch, etc. These sizes probably represent the bulk of production of headed parts. The longer die life, increased production per run, better maintenance of tolerances in production, and the lower die cost per piece associated with carbide dies, are therefore of par-

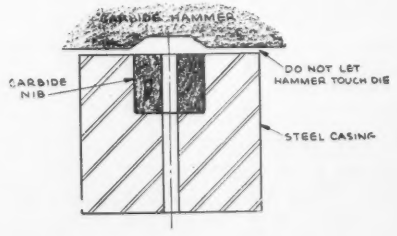

FIGURE 5.

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(TWISTING)
AND
STRANDING
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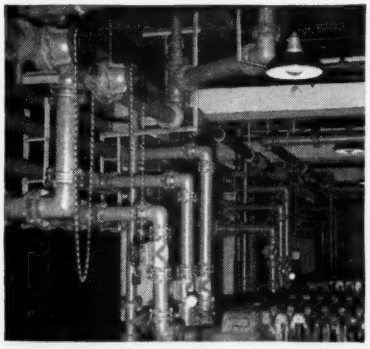

More than our laboratory tests and a few installations have established this figure. It comes from thousands of plant engineers who have successfully used Haveg pipe where the liquids handled get really hot and corrosive. Now, improvements in manufacture make genuine Haveg pipe available for immediate shipment. Why take a substitute "plastic" pipe when service-proven Haveg can give the long range economies of quality?

(Haveg is a moldable, thermosetting plastic material made from acid-digested asbestos and synthetic resin selected for specific service with a broad list of corrosive gases and liquids. Pipe made from Haveg is extremely resistant to thermal shock, seldom requires insulation, and is easily installed. Machining, alterations, repairs can be made on the spot.)

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ticular importance in the production of such parts.

★ ★ ★

The accepted "successful" range of carbide heading die applications now include nominal bolt sizes up to ¾ inch, thus covering approximately 93 per cent of total production of bolts and screws. Economical utilization of the larger sizes, however, depends on whether production runs are sufficient to take advantage of them.

★ ★ ★

Most types of rivets are currently produced with carbide dies and hammers, particularly those in the high volume field under 3/8 inch diameter. Here again it is important to avoid designs that bring the hammer in contact with the nib during the heading operation.

★ ★ ★

Applications are by no means confined to steel since nonferrous materials are also being "carbide-headed". Ratio of life compared with steel dies and hammers is about the same for nonferrous as for steel parts. The greater softness of the nonferrous materials generally is offset by their increased abrasiveness due to the greater susceptibility of those materials to oxidation.

★ ★ ★

In general, die and hammer life ranges somewhere between 10 and 40 times that obtained with steel dies, the average varying between 15 and 20 times.

★ ★ ★

From a cost standpoint, including original and maintenance cost, a life ratio of about 10 to 1 usually pays off. Life ratios higher than 40 to 1 have been obtained in some cases, but these are the exceptions rather than the rule. One die, for instance, produced 60,000,000 rivets, consisting of the original size plus two re-cuts to produce larger sizes.

★ ★ ★

Another major advantage of carbide dies is that on many operations, pointing (Fig. 6) can be done simultaneously with heading. For

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Each Mason spool is manufactured by modern mass-production methods that assure sturdy construction at minimum cost. Lithographing operations are efficiently performed in Mason's own plant to maintain exact quality control.

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MASON CAN COMPANY OF OHIO
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A SOLUTION TO YOUR PROBLEM that'll save on replacement and maintenance!

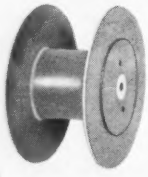
RUGGED STEEL
HEAVY DUTY PROCESSING REELS

HEAVY DUTY REEL

Designed for the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL

Made to wire rope mill's specification to replace light weight pressed steel reels that failed in heavy duty service.



SOLID STEEL PROCESSING SPOOLS & BOBBINS

WRITE FOR BULLETIN 52-W

Your inquiries are invited... write or phone, our field engineer-representative will be glad to describe our facilities.

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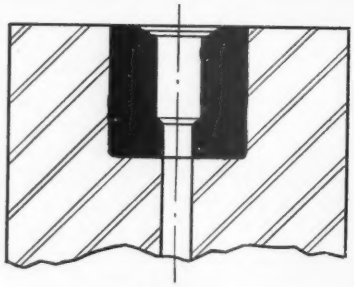


FIGURE 6.

such purpose nib inside diameters should be smaller. Allowance for this is made in the latest standardization.

★ ★ ★

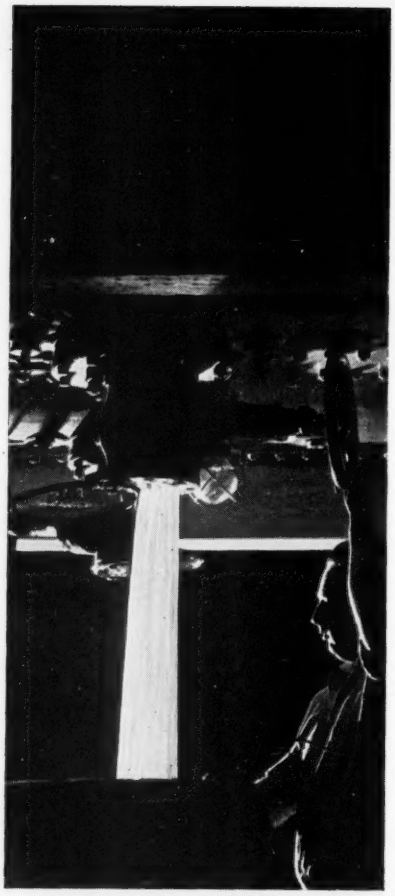
Aside from the longer life of the dies themselves, use of carbides for heading has another life advantage —that of the thread rolling dies commonly used for producing the threads on bolts and screws. Reason for the increased thread roll die life is directly traceable to ability to hold closer extruded shank tolerances over long runs. The absence of variation avoids placing an added load on the rollers. Even an increase of only 0.001 inch in thickness of shank can affect roller life materially.

Wiring Data and Weight Computer Offered by Hatfield Wire and Cable

The most complete pocket size wiring data and weight computer yet available to solve building wire, power cable, flexible cord, fixture and motor wiring problems has been designed by the **Hatfield Wire & Cable Division of Continental Copper & Steel Industries, Inc.** Hillside, New Jersey, manufacturers of insulated wire and cable for all electrical purposes.

★ ★ ★

This computer is the first pocket size model that has been able to supply all of the following information: current-carrying capacities for building wire and power cable systems; circular-mil areas for all wire sizes ranging from No. 14 through 1,000,000 cm; voltage-drop data; conduit sizes required for two, three, four, or six wire



2,000 GALLONS OF PROTECTION FOR YOU

The usual name for the liquid streaming into drums from our 2,000 gallon mixer is "lacquer." A more descriptive term would be "protection."

New England lacquer acts as protection for both the wire you make and the reputation you have as a manufacturer. As a tough, durable coating for your wire it helps insure satisfactory performance of your product to meet customers' specifications.

To be sure of maximum protection, specify *New England* lacquer, formulated to your exact needs by wire specialists!

The above photograph is one of many contained in an eight-page brochure describing our facilities to serve you. Write for your copy of the complete brochure!

NEW ENGLAND LACQUER CO.
150 KING PHILIP ROAD
EAST PROVIDENCE, R. I.

systems; sizes of wire required for motor wiring usages; the new type-letter designations, groupings and classifications of recently revised Underwriters' Laboratories' flexible cord and fixture wire; and temperature rating, current-carrying capacities and maximum-voltage ratings of flexible cords and fixture wire. It is also possible to obtain weights of bare, single-conductor wires in pounds per thousand feet for either solid, stranded or circular-mil gauges.

★ ★ ★

The computer will be distributed to Hatfield's customers in the electrical trade. It may also be obtained by writing on company letterhead to J. Q. Bourne, Department 27, Hatfield Wire & Cable, Hillside, New Jersey.

New Tool for Solderless Connecting

An estimated ten-billion soldered connections a year presently being made by the American communications industry may be eliminated by a new connecting tool now in production use by the **Western Electric Company,** manufacturing and supply unit of the **Bell Telephone System.** The wire-wrapping tool, jointly developed by engineers of Bell Laboratories and Western Electric, produces a gas-tight joint between terminal lug and the connecting wire in the assembly of electrical, electronic and electro-mechanical equipment.

★ ★ ★

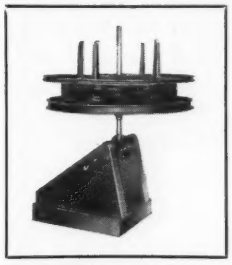
Basic problems in wire connections are reliability, cost and space. Coordinated efforts of Western Electric Company and Bell Telephone Laboratories over a period of years have shown that a solderless, mechanically wrapped-wire connection, made with a specially designed wrapping tool, will meet the requirements for an improved connection that can be applied to closely spaced terminals and at lower cost.

★ ★ ★

The tool is a hand gun that has a rotating spindle with an axial opening to receive the wire terminal and a second opening radially separated from the axial

MOSLO "SHIFTWEIGHT"
COUNTER-BALANCED WIRE REELS

Takes the Manual Labor out of loading a Reel with Wire. **Just unlock the knurled spindle by a twist of the wrist, tilt the reel assembly 90°, roll coil of wire to reel, lift 6″ on to centering arms, release lock by twist of wrist, use spindle as lever to lift, and the *Weighted Counterbalance does the rest!***



Immediate Delivery
$190.00 F.O.B. Cleveland

Capacity 300 lbs.—Min. Coil I.D. 10″—Max. O.D.—41″.
All welded steel construction—Brake Equipped.

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NORBIDE® Abrasive
The Hardest Manufactured Abrasive for Cutting and Polishing Dies

Highly satisfactory is Norbide Abrasive for ripping this large die. Fed from nozzle (right). A real economy in your die cutting department—second only to the diamond in hardness. Catalog 559-W.

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NORTON® Making better products to make other products better

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CRITICAL CUSTOMERS

For the past ten years we have specialized in the compounding of Vinyl extrusion and injection molding compounds to specifications, or developing compounds for a specific use.

Underwriters' approved standard compounds are available in all colors for POT, T, TW, 80 Degree C, 90 Degree C and 105 Degree C wires.

Save your plant space for wire processing equipment. Let us tailor your compounds to bring out the special properties you require.

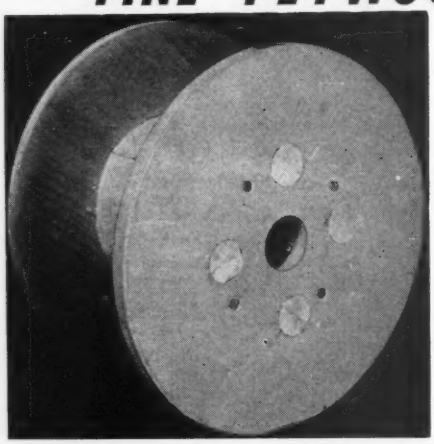
Your inquiries are invited.

ELECTRONIC RUBBER COMPANY

69 Sunnyside Ave. • Stamford, Conn.

FINE PLYWOOD REELS

FOR WIRE



Made of *air* dried wood, all parts secured with dowel pins, making the reel *all wood* in construction. These are the famous dowel constructed reels originated by WINCHESTER.

Accurately fitted dovetail joints result in reels that are extremely rigid and strong. No joints to open up.

Made in diameters of 6" to 48", returnable and non-returnable.

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ASHUELOT, N. H. **TEL.: WINCHESTER 163-2**

Our Products Carry Reel Loads.

opening into which the skinned end of the connecting wire is inserted. The gun rotates its spindle, which virtually shoots the wire around the terminal in a tight helix. Automatic positioning of the spindles makes for easy operation; controlled tension makes the highly uniform wraps. Contact pressure is at least 15,000 psi for the life of the connection. The result of this high tension is an indentation of the wire that requires a force of approximately 10 lbs. to strip from the terminal; actually the metal phenomenon "solid-state diffusion" improves the bond as time goes on.

★ ★ ★

Although the Western Electric Company does not plan to produce the tool, it will be made commercially available to electrical manufacturing companies such as radio, television and communications producers through licensed tool manufacturers.

Begins Production of Spooled Wire for Automatic Inert Arc Welding

The Drawalloy Corporation, a wire mill producing stainless steel and tool steel wire for the welding industry, has started production of spooled wire for automatic inert arc welding in its new and enlarged plant on Lincoln Highway West at Alloy Street, York, Pennsylvania, according to **E. J. Brady,** president.

★ ★ ★

Spooled wire of .035" to 3/32" diameter in all stainless steel grades is manufactured to the special chemical analyses required by the welding industry. The wire is precision-wound on labeled spools, marked for easy identification by distributors and users.

★ ★ ★

Each spool contains about 25 pounds of stainless steel wire, and consists of an extra-heavy expendable plywood spool packed in a new type of sturdy carton of Drawalloy's own design.

★ ★ ★

Complete information, prices, and literature may be obtained by writing the Drawalloy Corporation, York 16, Pennsylvania.

Variable Speed Motor Bulletin Features Improvements

A completely revised and amplified Bulletin, lithographed in multicolors, has been issued by the manufacturers of Varidrive motors. It outlines several scores of reasons why variable speed motors can be used to improve production and includes illustrations of all types of Varidrive motors. It includes 80 colored illustrations of motors, mechanical features, remote controls, etc.

★ ★ ★

A copy of this interesting 16-page Bulletin (No. 1797) may be obtained by writing to U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, California.

Pacific Coast Fastener Production Nears Self-Sufficiency

The West Coast is nearing self-sufficiency in bolts, nuts and rivets according to officials of **Bethlehem Pacific Coast Steel Corporation.**

★ ★ ★

Before the War, a large percentage of fasteners were sent from Eastern mills, Carl Howe, manager of Bethlehem's bolt and nut sales in South San Francisco stated. Added facilities have narrowed reliance on Eastern mills.

★ ★ ★

The South San Francisco plant now turns out 10,000 tons a month of bolts, nuts and rivets. About 8% of this production is galvanized. The fastener division accounts for about 10% of the steel made at the South City plant.

★ ★ ★

The plant produces a full line of fasteners ranging from ¼ inch to 1⅝ inches in size. Specialties range from 50 pound aluminum refinery conductor bars to special rivets so small that 10,000 of them weigh only 50 pounds.

★ ★ ★

Production has become more specialized since the war. The average number of pieces per ton has increased from 6,000 to 10,000.

High Quality

COPPER and BRONZE WIRE

High Carbon and Low Carbon Specialty Steel Wire

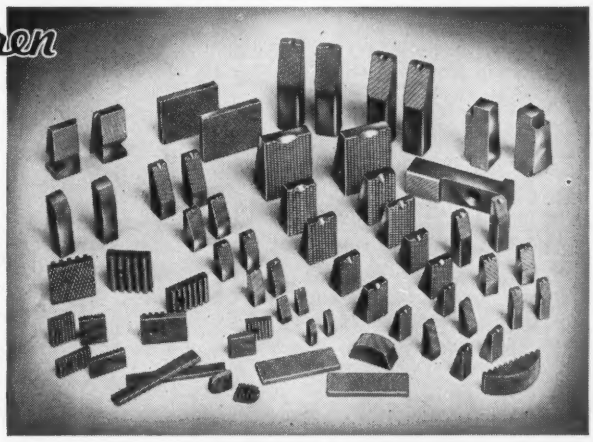
Spencer wire corporation

555 LEHIGH AVENUE, UNION, N. J.

Plants at Union, N.J., Hillside, N.J., West Brookfield, Mass.

Sjogren

JAWS . . . . for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



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SIX ADVANTAGES from just ONE DIP!

Here are the advantages you get when your stock is Borax-coated...

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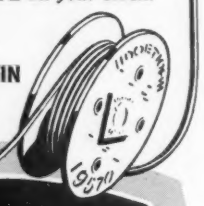
One dip puts on a Borax coat that is tight, yet pliable, and dries in a few minutes. It provides a good vehicle for your drawing lubricant and won't flake off. Borax-coated rods are a lot cleaner to handle in transit and are protected from rust while in storage. Try BORAX or BORAX 5 MOL on *your* stock!

Send for your copy of:
BORAX BULLETIN No. 2WD



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DIVISION OF BORAX CONSOLIDATED, LIMITED
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PHILADELPHIA

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

Production classed as specialties has increased 20%.

★ ★ ★

About one third of the plant's output is distributed through jobbers. Another third goes to the construction industry, farm implement makers and other large manufacturers. The balance goes to general contractors and the railroads.

★ ★ ★

The South San Francisco is second in size on the Coast to Bethlehem's Seattle plant. The company is considering a high tensile bolt line at its Los Angeles plant.

Opportunity for Wire Concern

Survey of business possibilities in Brownsville, Texas, indicates an opportunity for establishment of a metal cotton tie mill in the area, the Brownsville (Texas) Board of City Development has announced.

★ ★ ★

A combined production of more than 1,000,000 bales of cotton annually in the Rio Grande Valley and northern Mexico creates a need for more than 10,000,000 metal ties per year, although none are manufactured locally. Both labor and power are cheap and plentiful in the area, and water transportation facilities for import of steel sheeting are economical. The Board will forward detailed information to interested parties and assist in making contacts for locations, etc.

Industrial Safety Equipment Catalog

Safety Equipment Catalog #16 is available to industrial firms who request a copy on company stationery. Contains complete illustrations of all protective equipment for workers in most industries — for hands and body, head, face and eyes and feet and legs. Mention should be made of this publication when writing for catalog. You are invited to write to Parker Safety Equipment Co., 785 Lyons Avenue, Irvington, 11, N. J., for the catalog.

M & T STANNOUS SULFATE

Saves Tin!
in liquor finishing operations
because

M & T Stannous Sulfate — a manufactured chemical — saves tin by doing away with many of the inefficiencies which accompany the treating of feather or flake tin to produce stannous sulfate on the job.

More convenient to use, too!
Baths are operable as soon as materials are dissolved. Solutions can be prepared in advance to produce desired colors and coating thicknesses.

AND, additions are made from stock solutions, assuring quick, complete mixing—eliminating any possibility of materials only partially dissolving in the bath—reducing the chances of miscalculating quantities of materials added.

Use M & T Stannous Sulfate for white or straw-color finishes. Write for technical procedure sheet.

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100 E. 42nd St., New York 17, N. Y.
Specialists in Tin and Tin Chemicals

YARNS

For electric wire. Acetate, nylon and silk, natural or dyed. Put up on braider tubes, spools or cops.

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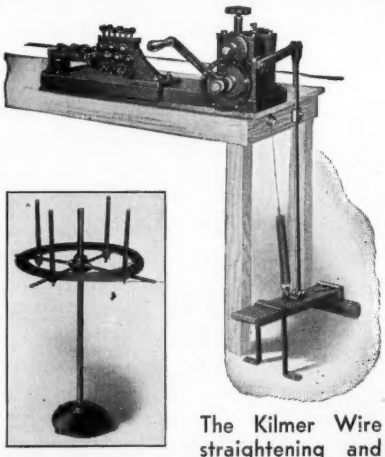
WIRE STRAIGHTENER



The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

M. D. KILMER & COMPANY
4840 BROOKPARK RD.
CLEVELAND 9, OHIO

Non Carbide Tools for Extruding Machines Have Extraordinary Life

The Wire Tool Division of Bridgeport Jig Boring Company, 303 Stratford Avenue, Bridgeport, Conn., are making records in the production of plastic and rubber covered electric wires.

★ ★ ★

These tools, called nozzle or guide tips, are the tools through which the plastic is forced in its application to wire. They are made to the highest precision tolerance and are so superior to the standard tool steel nozzles previously used in extrusion machines that in the last two years customers have found that they will produce 300 times the amount of wire that the previous types did.

★ ★ ★

In other words, a tool steel nozzle has a maximum life of 50,000 feet of wire, after which it must be replaced; whereas the carbide nozzle is running off 15 million feet of wire before showing signs of becoming off-size.

★ ★ ★

This remarkable result is a development of the Bridgeport Jig Boring Company, operated by Mr. Milewski and Joseph Coggianello, who have been engaged for some years in the production of tungsten carbide tools and parts made to extremely close tolerances to customers' specifications and who are organized to give special service to the wire industry.

★ ★ ★

Information on these nozzles will be furnished upon request to the Company.

Norton Introduces New Grinding Wheel

Norton Company, Worcester 6, Mass., has announced a new vitrified bond for their grinding wheels which users are claiming is a radical improvement.

★ ★ ★

Named "G-Bond," and identified by the symbols "VG" in the marking, field tests conducted in plants all over the country reveal incredibly good performance for cylindrical, centerless, surface, in-

Angier

Complete Spiral Wrapping Service

- Creped to s-t-r-e-t-c-h wraps to protect against rust, moisture, oil, or abrasion.
- Proven vapor method that stops rust without slushing . . . Angier VPI ® Wrap.
- Machines, devices for spiral wrapping.
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FREE — Spiral Wrap Booklet — FREE
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FOR WIRE, ROPE and PLASTICS

use those made by the largest plywood reel manufacturer in America.

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Telephone: PA 2-1300

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Manufactured to Your Particular Requirements
Prompt Shipments on Large or Small Orders

Specialists in the design and manufacture of all types of
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CARRIS REELS, INC.

"The Reel with the Plywood Barrel"

RUTLAND VERMONT

Cut Your Product Cost . . .

Stop struggling with wire worries. There's a Continental wire to help cut products costs — to add sales appeal. Let us know about your problem . . . Let Continental's helpful wire service work for you. .

CONTINENTAL STEEL CORP. STEEL CONTINENTAL WIRE KOKOMO, IND.

*Trade Mark Reg. U. S. Pat. Off.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

PRODUCERS Of Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized. KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3125"
45 sizes Bright Tinned, .003" to .125"
Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned
Coppered Steel Spring—Galvanized—Tinned
Monel—Nickel Silver—Pure Soft Nickel—Oil Tempered, Steel Spring, Black Finish
Phosphor Bronze, Spring Temper—Pure Iron Wire—Resistance Wire,
Hoskins Chromel "A"—Stainless, Soft and Spring Temper—Tag Wire, 1000
in an Envelope—Florist Wire—Spooled and Coiled, ¼-½-1-5#
Wires Straightened and Cut to length—Small Gauges—Small orders our specialty
Wires and Strands for the fishermen. Trolling Wires, Copper-Monel-Stainless.
Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

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We Pay Highest Prices for Used Machinery

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your idle and surplus

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WIRE & TEXTILE MACHINERY INC.
P. O. BOX 436, PAWTUCKET, R. I.

ternal, gear, tool and cutter, form and thread grinding, and saw gumming.

★ ★ ★

Developed in Norton laboratories following five years of research and testing, the new bond is proving its advantages on many types of precision and semi-precision operations.

★ ★ ★

"G-Bond's" ability to make a grinding wheel act so much better is due basically to the way the abrasive grains are held by the bond until they have accomplished their cutting job, and are then released to make room for new grains with fresh, sharp cutting edges. It is this unique ability that keeps the wheel's grinding surface at peak efficiency.

★ ★ ★

Norton's new bond can be used in conjunction with many types of abrasive including: 32 and 38 ALUNDUM abrasive, Regular ALUNDUM abrasive, 19 and 57 ALUNDUM abrasive.

★ ★ ★

Its advantages are seven: more work per wheel; cut cooler, freer and faster; more pieces per dressing and easier to dress; cover a wider range of jobs; hold shape; hold corners better; and ideal for crush dressing. All these mean improved quality of work at less cost.

New Bulletin Features Reliance V*S, Jr.

An informative, interesting booklet describing and illustrating a newly improved electronic adjustable-speed drive of from ¾ to 3-hp. designed for powering a wide range of small industrial equipment economically has just been released by the **Reliance Electric & Engineering Company,** Cleveland, Ohio.

★ ★ ★

Holding special interest for designers of small machinery, process engineers, production executives and purchasing directors among others, this 12-page bulletin (D-2102) provides a comprehensive yet concise presentation of the Reliance V*S, Jr. Attractively

printed in three colors and hole-punched for easy reference filing, it is well illustrated and written in a simple, straightforward, non-technical style.

★ ★ ★

Also listed are Reliance sales representatives in 45 cities across the nation. Copies of this factual bulletin are available on request. Write to the Reliance Electric & Engineering Company, 1111 Ivanhoe Road, Cleveland 10, Ohio.

Teflon Covered Magnet Expanding in Use

The Warren Wire Company of Pownal, Vermont, has issued descriptive literature concerning teflon insulated round copper magnet wire. This new product is said to be finding growing applications in conditions of heat, cold, corrosion, and necessity for high space factor, and in many ways is helping to answer some of the most difficult design problems, particularly in the electronics field. It was about a year ago that Cleveland E. Dodge, Jr., vice president of the company, at a special symposium described the construction and characteristics of the wire coated with the film developed by du Pont. The inert feature of teflon provides an enamel which is unaffected by corrosive vapors. It is also an excellent moisture repellant

★ ★ ★

The wire is available in many sizes. This company pioneered in the development and is said to be the first company to manufacture the product commercially.

★ ★ ★

The several branches of the Armed Forces, as well as NEMA, are presently compiling information with the thought of issuing a specification for high temperature magnet wire.

C. F. & I. Establishes Warehouse in Kansas

A new warehouse and sales center for steel products, chemicals, and fuel has been opened in Wichita, Kansas by **The Colorado Fuel and Iron Corporation,** it was announced by A. F. Franz, president of the corporation.

★ ★ ★

Serving the rapidly expanding agricultural, oil, construction, and manufacturing industries of Oklahoma, Nebraska, Missouri and Kansas, this modern sales and warehouse center will occupy 30,000 square feet of floor space. It will be an important sales distribution point for the products of CF&I's eastern and western plants. Giant spools of wire rope for the oil and construction industries are stored alongside farm fence, barbed wire, nails, screen cloth, and a host of other products designed to serve agricultural and industrial needs.

★ ★ ★

Last month's steel production and shipments at the Pueblo, Colorado mill of CF&I set all-time records, and the recent asquisition of John A. Roebling's Son Corpora-

THE MAN who is "YOUR WIRE SUPPLIER"

WIRE STRAIGHTENED AND CUT TO LENGTH

From 18 gauge through 5/8" diam.
WE WILL FURNISH THE WIRE or STRAIGHTEN and CUT YOUR STOCK.
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REELS **SPOOLS**
ALL SIZES
WOOD - PLYWOOD - WOOD - METAL
RETURNABLE NON-RETURNABLE
Samples and Prices on Request
DURKEE MFG. CO. **PINE RIVER, MINN.**

***Buy the Best:* MONTGOMERY SILVER-COATED COPPER WIRE**
Round for Kel-F & Teflon Insulated Radio and Instrument Hook-up Wire and UHF Cables.
Flat for Tinsel Ribbons and Tinsel Garlands.
— also —
Bare Electric Tinsel Conductors for Telephone-Razor-Hearing Aid Cords.
— also —
NEVA-TARN—Metallic Yarns—Tarnish proof— for knitted and woven fabrics. Est. 1871
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DIAMOND POWDER RECLAMATION

Will recover for you a higher percentage from used diamond powders, wheels, etc.

Your old cotton, die washings, worn wheels, sludge, etc., have great value.

With our process you can be assured of

MAXIMUM RECOVERY

Send us your waste diamond materials

We are also now supplying a complete line of top-quality

DIAMOND GRINDING WHEELS

Write for prices

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METAL BOUND RETURNABLE REELS

Made in 12" to 24" diameters.

No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

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Tel.: 145 Est. 1903

tion added cold rolled wire and strip, electric wire and cable and bridge construction materials to the corporation's line of steel products.

Carboloy Salvages Diamond Powder from Grinding Sludge

At the Edmore, Mich., plant of **Carboloy Department of General Electric Company,** a common cloth sugar bag is used to salvage diamonds from grinding sludge—recapturing enough diamonds in a month to have them made into four or five additional grinding wheels at a nominal cost.

★ ★ ★

The bag acts like a coffee strainer. It is tied to the exhaust end of the coolant pipe leading from the machines which grind cemented carbide tools with diamond grinding wheels. When other types of grinding wheels are used on the same machines, the bag is removed to allow the coolant and non-diamond sludge to go into the regular coolant reclamation system.

★ ★ ★

According to K. R. Beardslee, Carboloy's general manager, who is a member of the NPA's diamond conservation committee, the bag system still enables the coolant to flow into the reclamation system. But instead of making it necessary to clean out all of the sludge from the tanks, and processing it for the diamond particles, the bag saves only the sludge coming from the diamond grinding wheels. Salvaging diamonds in a mixed sludge, he stated, is difficult and too costly to pay off.

★ ★ ★

Anyone using this system has a choice of either selling the salvaged diamonds to the company doing the reclaiming for roughly $1.50 per karat, or just paying for the service and having the diamonds returned. So far, the Carboloy Department has found it better to have the diamonds returned and made into additional diamond grinding wheels.

HANS BOEHL, MACHINE WORKS,

Hueckeswagen/Rhld., Germany

—•—

EQUIPMENT

for

WIRE FORMING

WIRE COILING
(Spring Winding)

WIRE WRAPPING

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MECHANICAL

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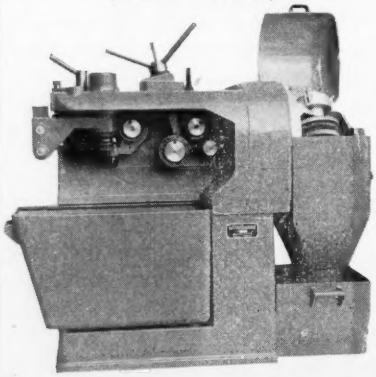

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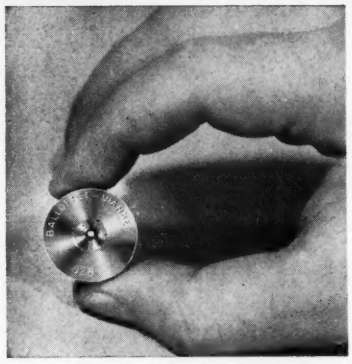

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Bulletin on New Rosin Core Solder Available from Federated Metals

Federated Metals Division, American Smelting and Refining Company has published a 4-page bulletin describing a new rosin core solder. Known as RTS 200, it is available in a wide variety of wire sizes, compositions and quantities.

★ ★ ★

The bulletin describes five ways in which the new rosin core solder is superior to ordinary rosin core solders. First, it has 20% greater spread; second, it has 4 times faster oxide penetration; third, it is non-corrosive; fourth, it is non-toxic, and fifth, it has a stable flux.

★ ★ ★

Copies of bulletin No. 158 can be obtained free from Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York, N. Y.

★ ★ ★

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For a copy, please write the company for Technical Bulletin No. 1-3-53.

High Speed Heating Furnaces

The current trend toward increased industrial application of high speed heating serves to highlight, as extremely timely, a new bulletin just released by **Surface Combustion Corporation,** Toledo, Ohio.

★ ★ ★

This bulletin, SC-162, points up the many advantages of high thermal head heating, with gas or oil, for press forging, upsetting, extruding, stress relieving of ferrous and non-ferrous metals. Basic furnace designs and burner arrangements are described in conjunction with the demands of overall or selective heating for semi-automatic or fully automatic production.

★ ★ ★

For copies of this bulletin write direct to the Advertising Department, Surface Combustion Corporation, Toledo 1, Ohio.

Catalog on Material Handling Equipment

A 31-page catalog, illustrating over 100 pieces of the various types and designs of materials handling equipment manufactured by the Fab-Weld Corporation, 3650 Richmond Street, Philadelphia 34, Pennsylvania, has just been published to aid in the solution of your materials handling problems. Among the items pictured are skids, pallets, stackable pallets, pallets and skid boxes, "Return-O-Tainers," racks, trucks, trailers, dump hoppers, car plates, truck plates and special equipment. This catalog shows actual installations of these items in use. Send for your free copy of form No. 31.

★ ★ ★

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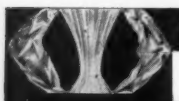
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New Catalog Describes Tank Linings

Nukem Products Corp., Buffalo 20, N. Y., has issued a new 8 page folder covering their corrosion-proof linings and acid brick sheathings.

★ ★ ★

The lining materials are Koroseal, Nuran rubber, rubber and Neoprene and Nu-mastic. Tables of resistivity to different corrosive substances for each lining material, together with discussions of each lining in the text, are provided. Diagrams and pictures illustrate good tank construction for pickling and other operations.

★ ★ ★

A copy of this bulletin will be sent upon request. Please write for A.I.A. File No. 35i-231.

Issues Furnace Bulletin

A new 12-page bulletin on Despatch Recirculating Heat Treating Furnaces has been published by the **Despatch Oven Company.**

★ ★ ★

Pictured in full color on the cover are a pair of Despatch Furnaces on a steel shell case line. Inside, the bulletin is profusely illustrated showing many designs of Despatch Furnaces in operation on a variety of heat treating applications.

★ ★ ★

Furnace performance records are given in several instances and a double page spread in the center of the bulletin is devoted to detailed specifications for pot type, batch and conveyor type furnaces. Anyone concerned with the heat processing of metal will find the contents interesting and informative.

★ ★ ★

Write for Bulletin 81 to Despatch Oven Company, 619 S. E. 8th Street, Minneapolis, Minnesota.

Technical Bulletin Describes Insulating Material

The M. W. Kellogg Co., P.O. Box 469, Jersey City 3, N. J., has issued a technical bulletin describing the

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properties of "Kel-F" a polymer of trifluorochloroethylene, a plastic for electric wire coating that is chemically inert, has high impact strength at low and elevated temperatures and good resistance to thermal shock.

Irvington Announces Plastic Core For Wire Rope

A plastic core for wire rope is now offered to industry after several years under development by the **Irvington Varnish & Insulator Company, Fibron Division,** Irvington 11, New Jersey. This core, of specially formulated plasticized vinyl chloride material, finds its principal application in wire rope used for oil and gas well drilling. Four years of service tests have given conclusive proof of field economies.

★ ★ ★

The vinyl core is highly resistant to acids, alkalies, alcohols, brine, aliphatic hydrocarbons and other subsurface substances which affect conventional fiber cores. The core material is processed of virgin compound and the manufacturer guarantees uniformity of production from shipment to shipment, with assurance that the operating abilities of the core at both low and high temperatures will always be uniform. Additional information and samples are available from Fibron Sales Department, Irvington Varnish and Insulator Company, Irvington 11, New Jersey.

New Diamond Tool Company Formed

Clayton S. Parsons of West Hartford, formerly New England and New York State Manager for J. K. Smit & Sons, Inc., has formed his own company, **Parsons Diamond Products, Inc.,** to manufacture, sell and service industrial diamond tools, diamond wheels, and abrasives. He will head the company as President and Treasurer.

★ ★ ★

Mr. Parsons said that the new corporation has secured an experienced engineering, production, and

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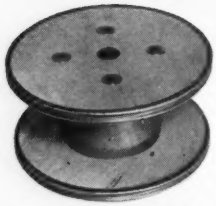

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sales staff with adequate facilities to give prompt, dependable service on any industrial diamond requirement.

★ ★ ★

Rockwell B. Ward also previously associated with J. K. Smit & Sons, Inc., has been made Vice President and **Frank H. Taylor** has been appointed Factory Superintendent.

★ ★ ★

Parsons Diamond Products, Inc. has main offices located at 968 Farmington Avenue, Clark Building, West Hartford, Connecticut. As soon as practicable, strategic branches will be opened and selected distributors appointed to enable them to render personal service throughout the country.

New Chart Shows X-ray Analysis Of Complex Alloy

A new 22½ x 29″ chart which shows the X-ray analysis curve for a complex alloy (Illium) is available from **Research & Control Instruments Division, North American Philips Company, Inc.,** 750 South Fulton Avenue, Mount Vernon, N. Y.

★ ★ ★

The horizontal scale covers goniometer angular positions from 7 to 112 degrees (two theta) and the vertical scale has an intensity range of 0 to 800 counts per second.

★ ★ ★

Curve shows peaks for Molybdenum, Tungsten, Copper, Nickel, Cobalt, Iron, Manganese and Chromium. X-ray lines include K Alpha$_1$, K Alpha$_2$, K Beta, L Alpha$_1$, L Alpha$_2$, L Beta$_1$ and L Beta$_2$, for values of $n = 1$ and $n = 2$.

★ ★ ★

Chart shows complete resolution for adjacent element lines. Inherent capabilities of the analysis method are demonstrated by the angular width of the peaks at half-intensity points.

★ ★ ★

Inset on chart at 94-98 degree point on horizontal scale shows how twenty-seven intensity-scale steps permit magnification of weak lines for more accurate evaluation. You are invited to send for a copy of the chart.

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New Use for Steel Springs

A steel spring, used in unorthodox fashion, is helping America's farmers to dry their corn. The spring is neither compressed nor stretched, but simply is placed in corn cribs to permit passage of air.

★ ★ ★

Known as Flexi-Vent, the sectional corn ventilating tube is being introduced this season by the **American Steel & Wire Division of United States Steel Corporation,** according to C. W. Meyers, the division's manager of spring sales. A patent application is pending.

★ ★ ★

The Flexi-Vent is a steel spring about 3 inches in diameter and 3½ feet long. As the crib is being filled, the springs are placed in right along with the corn, thus providing additional air space and natural ventilation.

Booklet Supplies Technical Data on Halowax Products

Characteristics of a representative group of Halowax refined, fractionated and crude chlorinated naphthalene products for industrial uses are described in a new 24-page booklet published by **Bakelite Company.**

★ ★ ★

The booklet, "Halowax Chloronaphthalene Oils and Waxlike Solids," presents charts and tables of interest to industrial chemists, in which chlorine content, electrical and physical properties of representative Halowax chloronaphthalenes are compared.

★ ★ ★

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Youngstown Sheet & Tube Company, The 863

WHERE TO BUY

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.
Only advertisers who have contracted for six or more insertions are listed in this section.

ABRASIVES—
Elgin National Watch Co., Abrasive Div., Elgin, Ill.
Norton Co., Worcester, Mass.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ACID-PROOF CONSTRUCTION—
Ceilcote Company, Cleveland, Ohio
Chemical Construction Co., Pittsburgh, Pa.
Haveg Corporation, Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio
Nukem Products Corporation, Buffalo, N. Y.

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.
Trauwood Engr. Co., Cleveland. O.

ANNEALING POTS AND BOXES—
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

BAKERS—(See OVENS—Rod Bakers)

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

BORAX—Wire Drawing
Pacific Coast Borax Co., New York, N. Y.

BORON CARBIDE—
Norton Co., Worcester, Mass.

BRAKES—Pneumatic
Entwistle, Jas. L. Co., Prcvidence, R. I.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CARTONS—Paper
(See CONTAINERS—Paper, for nails, etc.)

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Acid Proof
Ceilcote Company, Cleveland, Ohio

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Metal & Thermit Corp., New York, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Chicago.

CLEANING & PICKLING EQUIP.—
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, O.
Haveg Corporation, Newark, Del.
Holden, A. F., Company, The, Detroit, Mich.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

CLOTH—WIRE, All Metals
Chase Brass & Copper Co., Waterbury, Conn.
Roebling's, John A. Sons Corp., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Coppering
American Chemical Paint Co., Ambler, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.
Techema Co., Buffalo, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago.

COMPOUNDS—Extrusion, for Wire
(See Compounds—Vinyl)

COMPOUNDS—For Improving Drawing and Extrusion
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Metal Finishing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Metal & Thermit Corp., New York, N. Y.

COMPOUNDS—Phosphate Coating
American Chemical Paint Co., Ambler, Pa.

COMPOUNDS—Rust Preventing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.

COMPOUNDS—Rust Removing
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Standard Industrial Compounds Co., Chicago.

COMPOUNDS—Vinyl, for Wire
Electronic Rubber Co., Stamford, Conn.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Bick, Hans C., Inc., Reading, Pa.
Miller, R. H. Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Pacific Coast Borax Co., New York, N. Y.
Standard Industrial Compounds Co., Chicago.
Swift & Company, Chicago, Ill.

CONDUCTORS—Flexible, Electrical
Montgomery Co., The, Windsor Locks, Conn.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire & Textile Mach'y, Inc. (used) Pawtucket. R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

CORROSION PREVENTIVE PAPERS—
Angier Corporation, The, Framingham, Mass.

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

CUTTING TOOLS—Carbide
Carboloy Dept. of General Electric Co., Detroit.
Eastern Carbide Corp., New Rochelle, N. Y
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

CUTTING TOOLS—Wire
Manco Manufacturing Co., Bradley, Ill.
Porter, H. K. Inc., Somerville, Mass.

DIAMONDS—Industrial
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDERS—
Danforth, The C. W. Co., Youngstown, Ohio
Elgin National Watch Co., Abrasive Div., Elgin. Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Industrial Diamond Powders, New Kensington, Pa.
National Research Company, St. Clair Shores, Mich.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIAMOND POWDER RECLAIMING—
Boulin, Victor J., Inc., New York, N. Y.
Danforth, The C. W. Co., Youngstown, Ohio
Industrial Diamond Powders, Inc., New Kensington, Pa.
National Research Co., St. Clair Shores, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Carboloy Dept. of General Electric Co., Detroit.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Nord International Corp., Denville, N. J.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. of General Electric Co.. Detroit.
Continental Carbide Die Co., Lyndhurst, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Rayaloy Carbide Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Cold Heading
Carboloy Dept. of General Electric Co., Detroit
Continental Carbide Die Co., Lyndhurst, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metal Carbides Corporation, Youngstown, Ohio
Rayaloy Carbide Corp., New York, N. Y.
Vascoloy-Ramet Corp., No. Chicago, Ill.

DIES—Diamond
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Cochaud Wire Die Corp., New York, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Extrusion
Carboloy Dept. of General Electric Co., Detroit.
Continental Carbide Die Co., Lyndhurst, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Metal Carbides Corporation, Youngstown, Ohio
Rayaloy Carbide Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Wayne Wire Die Co., Hillside, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelly Wire Die Corp., New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Sjogren Tool and Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc, New York, N. Y.
Carboloy Dept. of General Electric Co., Detroit.
Cochaud Wire Die Corp., New York, N. Y.
Continental Carbide Die Co., Lyndhurst, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Ft. Wayne Wire Die., Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corporation, Youngstown, Ohio
New England Wire Die Co., Worcester, Mass.
North American Philips Co., Inc., Elmet Div., Lewiston, Me.
Rayaloy Carbide Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Universal Wire Die Co., Cranford, N. J.
Vascoloy-Ramet Corp., North Chicago, Ill.
Wayne Wire Die Co., Hillside, N. J.

DIES—Special Shapes, Etc.
Continental Carbide Die Co., Lyndhurst, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Ft. Wayne, Ind.
Murex, Ltd., Rainham, England
Rayaloy Carbide Corp., New York, N. Y.

DIES—Swaging
Murex, Ltd., Rainham, England
Rayaloy Carbide Corp., New York
Sjogren Tool and Mach. Co., Inc., Auburn, Mass.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Carboloy Dept. of General Electric Co., Detroit.
Continental Carbide Die Co., Lyndhurst, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Firth Sterling, Inc., Pittsburgh, Pa.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metal Carbides Corp., Youngstown, O.
Murex, Ltd., Rainham, England
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRUMS & TRAVERSES—Flange Steel
Entwistle, Jas. L. Co., Providence, R. I.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

DRYING EQUIPMENT
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio.
Rockwell, W. S. Co., Fairfield, Conn.

ENGINEERS—Consulting
Metal Fatigue—Fatigue of Materials Laboratory, Princeton, N. J.
Wire Insulating and Rubber and Plastics Processing—Hale and Kullgren, Inc., Akron, Ohio
Zinc—Imhoff, Wallace G., Co., No. Highlands, Calif.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FENCING & FENCES—Wire
Interlocking Fence Co., Morton, Ill.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

FOAM PRODUCING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Brazing
Electric Furnace Co., Salem, Ohio
Harper Electric Furnace Corp., Buffalo, N. Y.
Rockwell, W. S. Co., Fairfield, Conn.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Galvanizing Equipment
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F. Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engineering Co., The, Cleveland, Ohio
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Co., Inc., Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Morrison Industries, Cleveland, Ohio
Rockwell, W. S., Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Trauwood Engr. Co., Cleveland, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—for Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Belding Heminway, New York, N. Y.
Electronic Rubber Co., Stamford, Conn.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

INSULATING MATERIALS — Paper— For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
Canada Reels, Ltd., Bury, Que., Canada
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Manco Manufacturing Co., Bradley, Ill.
Mettler Machine Tool, Inc., New Haven, Conn.
Porter, H. K., Inc., Somerville, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Die Making
American Optical Co., Instrument Div., Buffalo, N. Y.
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Nord International Corp., Denville, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Davis-Standard Sales Corp., Mystic, Conn.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp. Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Lendt & Co., Inc., New York, N. Y.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Optical, for Dies
American Optical Co., Instrument Div., Buffalo, N. Y.

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g. Co., Youngstown, Ohio

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale and Kullgren, Inc., Akron, Ohio
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
Lendt & Co., Inc., New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany.

MACHINERY—Straightening & Cutting
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik, Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Maillefer S. A., Renens-Lausanne, Switzerland.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Hale & Kullgren, Inc., Akron, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Marshall-Richards Machine Co., Ltd., Crook, County Durham, England
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Marshall-Richards Machine Co., Ltd., Crook, County Durham, England
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Hale & Kullgren, Inc., Akron, Ohio
Herborn, Herborn, Germany
Marshall-Richards Machine Co., Ltd., Crook, County Durham, England
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Lendt & Co., Inc., New York, N. Y.
Marshall-Richards Machine Co., Ltd., Crook, County Durham, England
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Cleveland, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Morrison Industries, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison Industries, Cleveland, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio
Nukem Products Corporation, Buffalo, N. Y.

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS — (See COMPOUNDS — Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio
Nukem Products Corporation, Buffalo, N. Y.

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Company, Inc., Philadelphia.
Industrial Ovens, Inc., Cleveland, Ohio
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Metal Bound
Canada Reels, Ltd., Bury, Que., Canada
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Lavendier, Charles, Co., Inc., Pawtucket, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Canada Reels, Ltd., Bury, Que., Canada
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Lavendier, Charles, Co., Inc., Pawtucket, R. I.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
North Anson Reel Co., No. Anson, Me.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Canada Reels, Ltd., Bury, Que., Canada
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River Minn.
Lavendier, Charles, Co., Inc., Pawtucket, R. I.
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—(See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Indiana
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Nukem Products Corporation, Buffalo, N. Y.

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical)

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Wire Cutting
Porter, H. K., Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Pressed Steel Div., Republic Steel Corp., Niles, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Gerber, J., & Co., Inc., New York, N. Y.
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Gerber, J., & Co., Inc., New York, N. Y.
Spencer Wire Corp., Union, N. J.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., Inc., New York, N. Y.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, O.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Gerber, J., & Co., Inc., New York, N. Y.
Spencer Wire Corp., Union, N. J.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Gerber, J., & Co., Inc., New York, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
North American Philips Co., Inc., Elmet Division, Lewiston, Me.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.
Specialty Wire Co., Inc., Worcester, Mass.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Malin & Co., The, Cleveland, Ohio

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Special Shapes
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Specialty Wire Co., Inc., Worcester, Mass.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.
Specialty Wire Co., Inc., Worcester, Mass.

WIRE—Steel—Also Coppered and Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Erie Iron & Supply Corp., Erie, Pa.
Gerber, J., & Co., New York, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Erie Iron & Supply Corp., Erie, Pa.
Pittsburgh Cut Wire Co., Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Elmet Division, Lewiston, Me.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Belding Heminway, New York, N. Y.
Glass Fibers, Inc., Toledo, Ohio

YARN TESTERS—
Heineman Corp., Oscar, Chicago, Ill.
Scott Testers, Inc., Providence, R. I.

The WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON 3, NEW JERSEY, U. S. A.

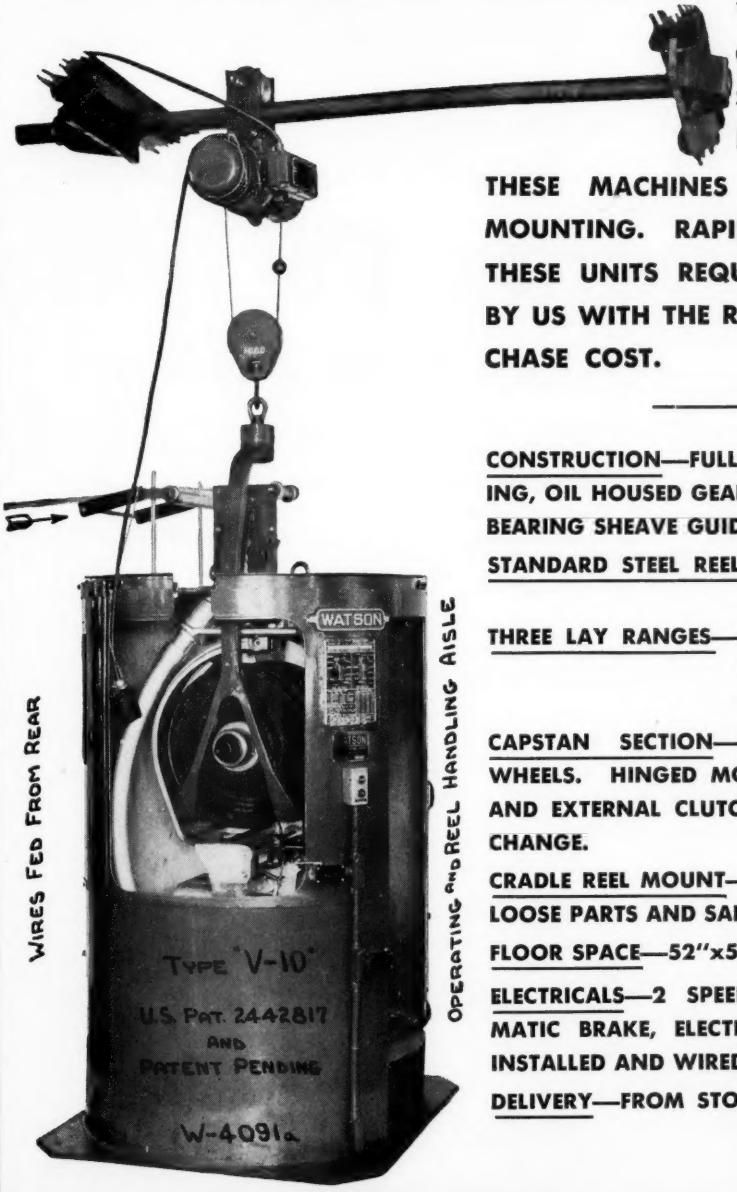
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

WATSON BUNCHER "V-10"

PATENT PENDING

THESE HEAVY DUTY UNITS, DESIGNED TO MEET THE DEMAND FOR INCREASED CAPACITY AND PRODUCTION ARE NOT ONLY USED FOR FINE AND HEAVY ELECTRICAL WIRE BUNCH STRANDING, BUT ALSO FOR MANY PRODUCTS ABLE TO ABSORB TORSION, i.e., GALVANIZED STEEL CLOTHESLINE, TELEVISION GUY WIRE, PAPER AND YARN TWISTING AND BUNCH CABLING OF SMALL PLASTIC INSULATED WIRES. MINIMUM FLOOR SPACE REQUIRED MAKE THESE MACHINES IDEALLY SUITED FOR ROW MOUNTING. RAPIDLY INCREASING DEMAND FOR THESE UNITS REQUIRES QUANTITY PRODUCTION BY US WITH THE RESULTING EFFECT OF LOW PURCHASE COST.



CONSTRUCTION—FULLY GUARDED, ALL STEEL, BALL BEARING, OIL HOUSED GEARING AND SIMPLEST THREADING BALL BEARING SHEAVE GUIDES.

STANDARD STEEL REELS—No. 9—22"x11" (650-LB. CU.)
No. 10—24"x14" (1000-LB. CU.)

THREE LAY RANGES—"LOW" —.64" TO 3.21"
"STD." —.79" TO 4.02"
"HIGH"—.95" TO 4.81"

CAPSTAN SECTION—HEAVY DUTY DOUBLE GROOVED WHEELS. HINGED MOUNT SIMPLIFIES LAY GEAR CHANGE AND EXTERNAL CLUTCH SHIFT SIMPLIFIES HAND OF TWIST CHANGE.

CRADLE REEL MOUNT—OVERHUNG SPINDLE TYPE WITH NO LOOSE PARTS AND SAFETY LOCK.

FLOOR SPACE—52"x59".

ELECTRICALS—2 SPEED MOTOR AND CONTROLS, AUTOMATIC BRAKE, ELECTRIC STOPS, SAFETY SWITCHES, ETC., INSTALLED AND WIRED READY TO RUN.

DELIVERY—FROM STOCK OR STOCK IN PROCESS.

9-53

AGING

ALUMINIZING

ANNEALING

BILLET HEATING

BRAZING

BRIGHT ANNEALING

CARBON RESTORATION

CARBURIZING

CERAMIC DECORATING

DRAWING

ENAMELING

GALVANIZING

HARDENING

HOMOGENIZING

MALLEABLIZING

NORMALIZING

NITRIDING

SINTERING

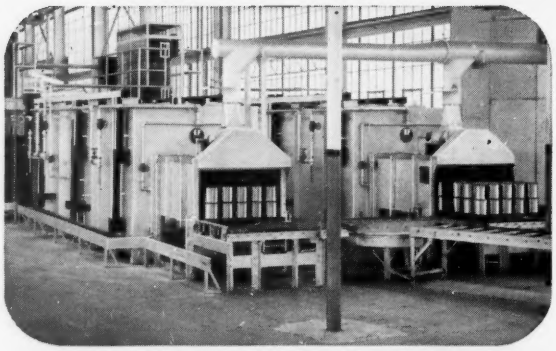
SOLUTION TREATING

STRESS RELIEVING

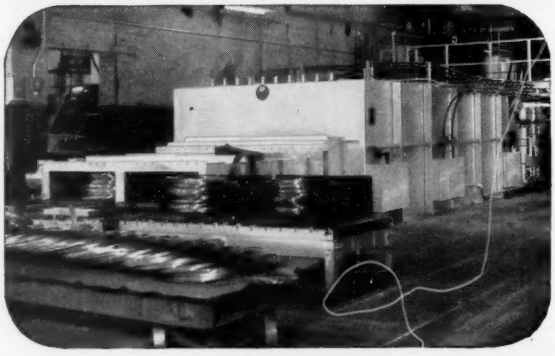
STRIP—ANY PROCESS

SPECIAL ATMOSPHERE TREATMENTS AND OTHER PROCESSING

EF gas-fired and electric furnaces are built in many sizes and types for bright annealing wire on spools or reels, in coils or strands—ferrous and non-ferrous, including stainless.



An EF continuous bright annealing furnace in which the wire is conveyed through the various zones on two parallel rows of bunkhead type trays.



EF PRODUCTION FURNACES

for these and other processes

Reflecting more than 30 years of continuous research, experience and outstanding engineering accomplishments, EF production furnaces combine high heating efficiency—accurate, automatically controlled cycles—high fuel economy—and produce products with uniform physicals and surface finish, year after year.

For advanced engineering designs that minimize maintenance and produce high hourly outputs, turn your production furnace problems over to one of the experienced EF furnace engineers—It pays.

THE ELECTRIC FURNACE CO.

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS, PRODUCT OR PRODUCTION

Salem - Ohio

Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada

Clean annealing alloy wire in an EF gas-fired radiant tube continuous roller hearth furnace. Handles coils up to 30" in diameter.